# STUDENT WASTAGE

## AN EPIDEMIOLOGICAL INQUIRY

## INTO PSYCHIATRIC AND ALLIED FACTORS CONTRIBUTING TO IT

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## SUMMARY

### Aims of the study

The general aim was to predict the students at risk of failing or dropping out during the first year at Edinburgh University with a view to providing necessary help and guidance as early in their career as possible.

More specifically, the study set out to examine if certain scholastic, social, motivational and psychological characteristics of the students and certain factors connected with their experience at the University, were related to their subsequent performance in the first degree examination. Further, it was aimed to construct a prediction scale by making a combined use of the different relevant variables and to test its efficiency.

### Design and method

The study was prospective in nature. The population consisted of first year students, defined for the purpose of the inquiry as those who joined Edinburgh University in the year 1967-68, had never been to any University before and were preparing for their first degree.

The investigation was carried out with the help of two questionnaires, one given to the students when they joined the

University and the other, six months later. The first questionnaire contained items on the social background, scholastic achievement, home situation and motivational factors. It also included Personal Disturbance Scale (Foulds and Hope 1968) and the Hostility and Direction of Hostility questionnaire (Caine et al 1967), and these were given to test emotional disturbance and certain personality characteristics. The second questionnaire inquired about residential and financial arrangements while at the University, interest taken in extra curricular activities, satisfaction with the course, contact with the staff and health, both physical and mental.

For the purposes of analysis, the students were divided into four groups, Very Successful, Moderately Successful, Failures and Voluntary Drop-outs. Standardisation of marks was carried out to increase the comparability of the student's performance in different subjects. The analysis was carried out separately for males and females.

Two prediction scales were constructed, one based on multiple regression (Multiple Regression Scale) and the other based on a simple procedure in which the different variables were not weighted with respect to each other, (Simple Prediction Scale). The Multiple Regression Scale was prepared from $^{4}/_{5}$th of the total sample and cross-validated by using it on the other $^{1}/_{5}$th of the sample.

Findings

99% of the students (1,860 in all) responded to the first questionnaire and 91% (1,705 in all) responded to the second.

The principle findings were as follows:-

For both males and females: Low School Achievement Score, having a Scottish Certificate of education (S.C.E.) instead of a General Certificate of education (G.C.E.) and low satisfaction with school performance were related to poor academic performance (i.e. to failure and drop-out).

Those over 20 performed worse than those below 20. Scottish students performed worse than the 'Other British'. High interest in extra-curricular activities at the University was related to good performance. High Personal Disturbance score had a positive but weak association with poor performance. Foreign nationality, low religious participation and an unfavourable attitude towards coming to University were related to high drop-out but not to failure.

For females only: Lower social class, low educational achievement of the parents, manual occupation of the father and having no other financial help besides a grant were all related to poor performance. Those with fathers not in favour of their coming to the University showed a high drop-out rate.

For males only: Emotional disturbance 'reported' six months after coming to University was related to poor performance.

Both on the Multiple Regression Scale and the Simple Prediction Scale those in the highest of the seven categories on the respective scale had negligible chances of failing or dropping out, while those in the lowest of the seven categories had more than a 50% chance of being unsuccessful. The Multiple Regression Scale was cross validated very satisfactorily.

The Simple Prediction Scale is recommended for practical use and a 'scheme' to provide help and guidance for prospective failures and drop-outs, is outlined.

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# INTRODUCTION

Out of the 358,386 undergraduate students in Great Britain who might normally have been expected to emerge at the end of the academic year 1965-66, with a first degree, 4,688 (13.1%) left without one. Most of these students withdrew because they had failed an examination. (U.G.C. report 1968).

Education, especially higher education was not, until recently, a matter for public discussion. This 'sacred field' was solely the prerogative of University dons who, apparently, were quite satisfied with the more or less intuitive criteria on which they passed or failed the students. The question, "Who leaves the University without a degree?" would be coldly disregarded because of the obviousness of the answer: "One who is not good enough". The proof of this attitude lies in the fact that only a few years ago it was not a normal practice for the University offices to keep a record of the students who left during the course.

These attitudes are changing now and many people are showing an interest in the problem, though for different reasons. University authorities, in the face of a sharp rise in demand for places, are getting concerned about the efficacy of the selection procedures. Because of the post war increase in grants awarded to the students, the General public is anxious to know if a proper use is being made of the tax-payers' money. The Medical profession is

interested: with the establishment of University Health Services, the doctors are seeing for themselves how emotional problems can cripple a student's academic performance and convert a capable individual into a 'Failure'.

One evidence of the increased interest in the fact is that the Robbins' Report (1963), a milestone in the history of higher education; devoted a special section to "Student Wastage".

Significance of the Problem:

It is no longer in bad taste to talk of the Economics of Education. It is permissible as Bowman says; even in the "..... holiest of ivory towers and elitist cultures .....". "Economics (of Education) like sex, is becoming almost respectable parlour conversation". (Bowman 1966).

Schultz (1961) was perhaps the first to talk of Education in terms of "Human Capital". To him Education was an investment, not just a consumption; and the language of Economics could be used to compare the resources utilized with the increase in production which resulted.

The capital gains of Higher Education accrue not only to the individual who gets the degree but also to those around him and the society in general. Blaug (1965) mentions nine different kinds of "spill over" gains to the society, including the provision of an environment which stimulates research in science and technology, reduction in demand on social services and the gains to the sub-:sequent generations.

If Education is an investment, it follows that "leaving without a degree" is an inefficient use of the resources. Malleson (1963) made a rough guess that society spends about £700 per student per year and a 13% 'wastage' rate meant a loss of about £5 million every year! Besides this direct loss of money there is the question of a wastage of University places and the failure to utilize equipment and trained staff.

The problem is not purely Economic. For every student taken there is one whose application was rejected and therefore one failure is a loss of opportunity to two people.

The individual who failed and left the University must also not be forgotton. Failure is a bad word and the attitude of the society may be guessed by the names given to the students who leave without a degree. They have been described as "Drop-outs", "Non achievers" and "Casualties". The phenomenon has been labelled: Wastage, Attrition and Mortality (!). To quote Malleson once again, "failure .....merited or not, hangs heavy upon him (the student); not only in terms of his own self respect but also in the reluctance that other institutions and employers have, to accept him in positions at his true level of ability ..... There is no one to turn to". (Malleson 1968).

American Colleges realised the significance of the problem a long time ago, perhaps because in the U.S.A. Colleges have always been regarded as training centres rather than sacred places. American research on 'Drop-outs' has a history of almost fifty years. Lately,

however, a number of workers in the U.S.A. have made statements which imply that the drop-out problem was perhaps over-played in the past. Kubie (1965) regards dropping-out as a growing up experience. Shriver (1964) says, "If the College sophomore wants to drop out of school - let him. Let the bored or confused or burned out undergraduate have a short meaningful interlude - a sojourn in reality - for a year or two years, so that he can be revitalized, committed and concerned enough to finish both College and graduate work."

It is worth noting that the focus of research in the United States is also changing and while the earlier workers were concerned with the prediction of the students at risk of dropping-out, there is a trend now towards a theoretical and almost abstract description of the drop-out phenomenon. Americans can perhaps afford to take this attitude. Every high school student who wants to go to College can get a seat at one or other of the institutions (Darley 1962) and therefore the nation need not feel the 'guilt' that a wasted place at the University could have been utilized by a rejected applicant who might have made a better use of it. Again, in the U.S.A. most students pay for their own education; and if a 'customer' wants to leave College, it is his pleasure! In any case, a student in the U.S.A. who leaves College can come back when he wants, the readmission rules being very lenient. In Britain the situation is quite the opposite and what is needed is a practical approach to the problem.

Complexity of the Problem:

The problem of student wastage is multidimensional a variety of scholastic, social and psychological characteristics of the student interacting with the characteristics of the department, faculty and University, to determine a particular outcome - success or failure. Besides failure, there is the problem of 'Voluntary drop-outs' who leave the University for non academic reasons. The issue is further complicated by the "built in" wastage in various faculties where the traditional failure rates are maintained, irrespective of changes in the 'quality' of the students!

British research on the subject is very limited; also it is very much compartmentalized. An educationalist relates school grades to the academic performance at the University; a sociologist investigates the effect of socio-economic background and a psychiatrist looks for the emotional factors influencing failure and 'drop-out'. Such an approach is not suitable for investigating a multidimensional phenomenon like student wastage and resembles "the attempt of a blind man to describe the whole elephant from the part of the latter's body he is holding in his hand". Macklin (1951), a medical man, says that one of the main causes of failure is emotional disturbance. Mountford, an educationalist (1957), says that illness does not figure prominently as a factor in failure and hopes that the health service is not utilized in such a fashion as to turn a student into a "neurotic valetudinarian".

What is wanted is a composite picture of the "elephant", and this means a study, comprehensive enough to cover as many of

these different factors as possible.

The Present Study:

The author's interest in the project was sparked off when, during the course of clinical work at Edinburgh University Health Service, he noticed how emotional problems could interfere with the students' academic work. A preliminary review of literature revealed the complexity of the problem alluded to previously and he realised that there would not be much point in looking at emotional factors in isolation unless the other relevant factors could be controlled.

A decision was made, therefore, to start an investigation, which besides examining the psychiatric factors would also pay attention to the various scholastic, social and psychological factors and relate all these to student wastage at Edinburgh University. A decision was also made to look into the student's experience while at the University and relate the various aspects of this experience to failure and drop-out. The criterion was the academic performance during the first year.

The general aim of the study was to predict as accurately as possible, those at risk of failing or dropping out, so that the necessary help could be given to them early in their career. The author must confess that, [redacted] in the earlier stages of planning he toyed with the idea of designing a study which could also help in improving the selection procedures. The idea was, however, dropped for the following reasons:-

1. A study which aims at improving 'selection procedures' must for obvious reasons look not only at those who gain admission to the University but also those who applied and were rejected. Because of various practical reasons, this did not seem to be possible.

2. The Robbins' Report visualises a time in the future when University places would be increased to a number large enough to meet the requirements of the country. If this happens, the situation might become similar to that in the U.S.A. where every high school student, if he so wishes, can gain admission to a College. The problem would then be of 'differential selection' and not selection as such. The students would, however, still fail and drop-out and would still need help and guidance in preventing unnecessary failure.

The subsequent description is about the main investigation, and following the conventional method of presentation, the first section deals with the review of literature.

# REVIEW OF THE LITERATURE

# Chapter 1

## THE PROBLEM

"Research on college student drop-outs and college student attrition has a history of 40 years" (Summerskill, 1962). This research activity has mostly been confined to the United States and the studies carried out in Britain have, until very recently, been "very timid, rare and on a small scale" (Butcher, 1968).

The degree of effort put into the field is reflected by the number of papers published in various journals. Garret (1949) reviewed 194 papers. Fishman and Pasanella (1960) located 580 studies which were conducted in the 1950s. Many more studies have been published since then. It comes, therefore, as an anticlimax that "attrition rates have not changed appreciably" (Summerskill, 1962).

In this review no attempt is made to summarise individual studies. Excellent reviews of that nature are already available: Stagner (1933), Harris (1940), Garret (1949), Knoell (1960), Summerskill (1962), Sexton (1965) and Marsh (1966) deal mostly with American literature. Eysenck (1947), Himmelweit (1950) and Dale (1952) pay special attention to British literature. Butcher (1968) deals exclusively with the British literature.

The aim of the review is to show how the difficulty in achieving a precise definition of terms like 'student wastage' and 'drop-out', and the intricate multidimensional nature of the causation have prevented a clear understanding of the problem. Results obtained in a number of studies are mentioned to illustrate this central theme. Some studies have, however, been selected for special critical evaluation for one or more of the following reasons:-

(a) They are British and therefore more relevant.

(b) They are recent and hence more likely to influence the present day thinking on the subject.

(c) They show certain novelty of approach which makes them stand out.

Extent of the Problem

Wastage rates in Britain: Very little was known about student wastage in Britain before the 1950s. The Universities kept records of students failing in the final examinations but no figures were available about the students who dropped out earlier (Malleson, 1958). Early efforts in this direction were modest and limited to a single course in single institutions (Saunders, 1952).

Sir James Mountford (1957) was the first to carry out a comprehensive survey of the total entry to a University. He examined the records of the students who entered Liverpool University in 1947, 1948 and 1949 and found that on average 13.1% of students failed to graduate and left their courses. Malleson (1958) found a 15.5% failure rate for University College, London, and Locke found a 15% failure rate in Keele University. Craig and Duff (1961) reported a wastage ranging between 16% to 19% in Edinburgh University Science Faculty.

Robbins' Report (1963) is a milestone in the history of higher education in Britain and, besides other things, it summarises the results of three marathon surveys carried out by the U.G.C. in the years 1952, 1955 and 1957. The average 'wastage' in a number of unnamed Universities was of the order of 16.7%, 13.9% and 14.3% respectively.

In 1968 the U.G.C. published another report but this time instead of covering an entry in a particular year, it referred to the students expected to emerge at the end of 1965-66; 13.3% had left the University without getting a degree.

All the four surveys by the U.G.C. give very similar 'overall' wastage figures. There are other similarities. All the surveys show that:-

(a) the highest wastage occurs in the first year.

(b) the wastage is greatest in Engineering and Technology.

(c) every four out of five students leave for so-called academic reasons.

The diversity of wastage: Though a great diversity in wastage figures was suspected all the time it was fully revealed when the U.G.C. (1968) gave the names of the Universities included in the survey.

(a) Wastage varies from University to University. Cambridge has the least wastage at 3.4%. Oxford is very near with 5.1%. Edinburgh has a wastage rate of 16.2%. St. David Lampeter University in Wales has a wastage rate of 40.5%. English Universities have an average wastage rate of 12.7%, Welsh of 13.4% and the Scottish Universities of 18.5%.

(b) Wastage rates in the same subject vary from University to University. There is a wastage of 1.8% in the Arts courses at Cambridge and of 15.1% in Edinburgh. It is apparent from the report that wastage for a particular course is more related to the overall figures of the University than to one in the same course at another University.

(d) Constancy of overall wastage over the years hides the tremendous reduction achieved by some departments. Though Medical courses show roughly the same overall wastage rates over the years, Edinburgh University Medical Faculty reduced its wastage figures from 23.5% in 1958 to 9.5% in 1962 (Perry, 1966).

It is difficult to believe that these huge differences are really due to the difference in the quality of students in different Universities. The differences appear to be due more to the variability in examination procedures and to the policies of the various departments. An examination of the examination procedures and departmental policies, therefore, seems to be in order.

Examination as a criterion for judging success and failure

Two questions need to be answered in connection with the examination procedures.

The first question is about the validity of examination procedures. The question is impossible to answer because of our inability to define in precise terms the aims of education, and the teachers and professors hesitate to tackle this fundamental issue (Cox, 1966). Bloom et al (1956, 1964) took the courageous step of establishing a taxonomy of educational objectives and suggested techniques of assessing each objective. It is unfortunate that this very important lead given by Bloom and his colleagues has hardly been followed up.

Thorndike (1949) says that an ultimate criterion is hardly ever available and one has to substitute for it a criterion, "which we judge,

either in terms of rational analysis or in terms of empirical evidence to be related to the ultimate criterion". Himmelweit (1963), taking a cue from Thorndike, points out that "bearing this qualification in mind, examination results constitute the best available, quantifiable and reliable criterion .....".

There have been faint attempts to challenge this conservative viewpoint in the United States. Holland (1961) developed an achievement scale based on a number of original papers published, prizes won and the inventive projects completed by the student, and found that such creative achievements were unrelated to grades.

Research into the validity of examination techniques, though a very important issue, is not of direct relevance to the point made above about the variability of wastage figures. Present wastage figures are related to the present examination procedures, whatever their validity.

What is more directly related is the question of whether or not the examinations are a reliable method of assessing the student's performance. The answer to this question is again in the negative. A number of workers (Eelles, 1930; Hartog and Rhodes, 1935; Bull, 1956) have commented on the unreliability of examination procedures. Hartog and Rhodes for example found that when five examiners were asked to mark a set of English essay papers the mean mark was 19.6, but there was a great dispersion around the mean, one examiner giving a mean mark of 7 and another a mean mark of 36. This reflects the poor inter-examiner reliability. Bull (1956) found that marking for medical school examinations, besides showing a poor inter-examiner reliability of .42, also showed a poor test-retest reliability of .26.

The poor reliability leads to misclassification in the same department, some students with poor performance being misclassified as 'successes' and vice versa. The reliability, if poor in one department, will be poorer across the departments (Cox, 1966) and lead to an even greater degree of misclassification. When the various departments talk of their failure rates they are not, therefore, always talking about students with similar capabilities and similar performance.

"Built in" wastage rates

The passing or failure of the student is more related to the traditional policies in departments than to the capability of the student. Malleson (1963) gives it the apt title of "Built in" wastage rates. Austwick (1960) actually proved the point by showing that the failure rates in the Sheffield Arts Faculty remained constant, despite the remarkable improvement in student intakes as judged by better scores on joint Matriculation Board examinations. Aikin (1963) found a similar pattern in an unnamed American College.

The traditional wastage rates can, therefore, differ from department to department and University to University because of a relatively strict examination policy in one as compared to the other.

Classification of wastage figures

Knoell (1960) rightly shows concern about "lumping together into the drop-out category" all students who leave without getting a degree. The Robbins' Report (1963) shows a similar concern and suggests the following classification of student wastage:-

1. Wastage due to academic reasons:
   (a) Completed the course but failed the examination.
   (b) Failed an examination before the end of the course.
   (c) Withdrew due to academic difficulties.
2. Personal reasons, illness, financial, etc.
3. Disciplinary reasons.

Such a classification would be legitimate if these were 'pure' categories and sharp boundaries existed between them. This is just not true. Personal difficulties lead to academic difficulties and vice versa. The inadequacy of the classification is revealed in an examination of Table 10 in the U.G.C. Report, 1968. Sixty-one per cent of the students who leave the University of Sussex do so for reasons other than academic failure, while in the Heriot Watt University only 3% of the total drop-outs do so.* It is not conceivable that Sussex University selects students who are especially burdened by personal difficulties, etc., while Heriot Watt is exceptionally lucky in this respect, or that Sussex University inflicts personal problems on the students! The reason lies probably in the different amount of interest taken in the students' personal problems in the two Universities.

Other classifications have been suggested. Rose and Elton (1966) divided their group into: (a) Defaulters who leave in the first semester; (b) Successful Persisters who do well and stay on; (c) Probation Persisters who do badly and stay on and (c) Drop-outs who leave, in spite of having shown their academic capability by doing well in the examination. In their

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* These figures are computed by the author from the data given in the table.

study they actually found these groups to have different psychological characteristics.

Eckland (1964) suggests that drop-outs should be divided into: (a) those who come back and (b) those who stay out permanently.

Comparison with American figures

McNealy (1937) investigated drop-out rates in 24 colleges and found that 45% abandoned the course and 17% transferred to other colleges. Iffert (1957) studied the problem in 149 institutions and found that out of those admitted in 1950 half were lost in the next four years. A comparison of British and American figures must not, however, lead to self applause, since the problem is different in the two situations.

(a) Selection is much more rigorous in Britain as compared to the U.S.A. Every applicant in the United States can find an accredited college that will admit him, irrespective of his ability level (Darley, 1962). Only about half of the applicants in Britain can expect to get admission. U.C.C.A. Statistical Supplement (1968) shows that only 52.5% of those who applied through this central organisation gained admission.*

(b) Readmission criteria are more lenient in the United States colleges. Ninety-seven per cent of drop-outs came back to college, as shown by a long-term follow-up carried out by Pervin (1966) at Princeton. No study of the same quality has been carried out in Britain. The U.G.C. (Robbins' Report, 1963) in an admittedly short term survey

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* Most students apply through U.C.C.A. Only 2% of the total admissions to Universities in 1967 were through other channels.

found that 8% of the students were readmitted. The follow-up study carried out by Kendall (1964) with the drop-outs in University College, London and Liverpool University is very often quoted but the response rate was so low (only 20.8% of the drop-outs and 55.1% of the controls replied) that it is difficult to put any trust in its findings.*

The American drop-outs are secure in the feeling that they would be admitted if they reapplied. The fact that almost half of them leave for non-academic reasons (Iffert, 1957 and Pervin, 1966) is perhaps a reflection of this sense of security.

(c) American students are, however, insecure in another sense. Quite a high proportion of the students have financial problems. Financial problems come high on the list of causes of drop-out (Iffert, 1957). British students, being mostly supported by grants, do not have this problem to that extent.

What is wastage?

It has been demonstrated that when different departments, different faculties, different Universities and different countries talk about student wastage and drop-out they are not always talking about the same thing. There is no common definition of wastage. The constancy of overall wastage figures over the years (U.G.C. Surveys, 1952, 1955, 1958 and 1968) seems to be nothing but a vindication of the law of averages.

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* 40 out of 186 males and 12 out of 70 females seem to have gained a degree afterwards. This may be an untrue representation of the real situation. One would expect that those who are doing well will show a greater willingness to fill up the questionnaire!

Knoell (1966) suggests that to find the factors which bear a constant relation to drop-out phenomenon, a national census should be carried out. This would, however, be unrealistic until a common definition of the phenomenon is achieved. The U.G.C. Surveys, therefore, tell a very incomplete story.

These remarks should be borne in mind while going through the next section on the factors related to student wastage. The contradictory findings in different studies will then perhaps be less exasperating!

## Chapter 2

## FACTORS RELATED TO STUDENT WASTAGE

Most of the 'wastage' in Britain is due to failure in examination. There is, therefore, a great overlap between the studies relating to academic performance in general and student wastage or drop-out in particular. Both types of studies are considered in this section.

Grades in school leaving examinations, interviews and headmasters' reports have traditionally been used as selection measures in British Universities. Before proceeding with a review of the relationship between specially chosen predictors and academic performance, it may be worth while examining the validity of these selection techniques.

Grades in School Leaving Examinations: The first detailed British study relating the school achievement to the performance at University was that carried out by the Scottish Council for Research into Higher Education (1936). A number of predictors, e.g. average mark, teacher's ranking, marks in individual subjects at the school level were related to a number of criteria at the University level, e.g. average mark, marks in individual subjects. The highest correlation obtained for any predictor - criterion combination - was of the order of .6.

Williams (1950) tried 68 correlations between the 'A level grades' and the University examination results. Thirty-one of them were not significant statistically; this was not surprising since the subjects were often unrelated. Some correlations, however, were very significant. Latin examination results at the two levels showed a correlation of .79. Furneaux (1961) investigated a number of similar studies and found that such correlations varied between .5 to .75.

Barnett and Lewis (1963) carried out a sophisticated canonical analysis, relating the performance of 1,300 students who took the Joint Matriculation Board examination of the Northern Universities with their subsequent University performance. The criterion was divided into six categories (from 1st class to Fail). The Universities were divided into eleven groups. Different subjects at school level were combined in various ways and the best predictor combination had a correlation with performance ranging from .4 to .45 in the eleven groups of Universities.

Similar results have been shown in other countries. Fishman and Pasanella (1960) analysed 263 studies and found an average correlation of .50 between the high school grades and University examinations. Parkyn (1959) reports a correlation of .54 between school achievement and University examinations.

It may be pointed out that all the studies show a much better relation between school achievement and first year University examination than with the later examinations.

The study carried out by Pilliner (1960) in the Arts Faculty of Edinburgh University deserves special mention. Using a rather arbitrary weighting procedure, he related among other things the overall performance at school with the overall performance at University. He found that for the 1953 entry the correlation between the two measures was .48 for the Ordinary M.A. course and .16 for the Honours course. For the 1954 cohort the results were not only different but the differences were in opposite directions. The correlation for the Ordinary M.A. course was now .14 and for the Honours course it was .33. No revolutionary change seems

to have occurred in that period, in the courses, examiners, or the marking system. He also found that the number of passes at school level was as good a predictor as the scale weighted according to grades. The two predictors when used in combination improved the correlation.

Craig and Duff (1961) in an earlier study carried out in the Science Faculty of Edinburgh University found no relation between the number of passes and the first year performance at the University. What they did find was that the students with G.C.E. 'A' levels did better than the students with Scottish highers. This may not, however, be taken as a reflection on Scottish students.

The Committee on student wastage in Edinburgh University (1967) took this discrepancy into account and thought that it was due to (a) higher standards in G.C.E. 'A' levels, (b) higher qualifications demanded from non S.C.E. students, (c) a bigger 'tail' in Scottish students because of proportionately more Scottish school children going to University.

The low correlation obtained between school achievement and the University performance may be due to the following reasons:-

1. Predictors assessed by instruments of low reliability (school examinations) are being matched with a criterion measured by instruments of low reliability (University examinations).
2. The range of ability in the students who get admitted to University is small. The greater the selection in favour of the top group, the more homogeneous the group will be. It is a statistical fact that <u>the more homogeneous the predictor, the lower will be its correlation with the criterion</u>.

It has been suggested by Shuman (1956), among others, that the results may be improved by raising the entrance qualifications. This is logical but, since the correlation between entrance qualifications and performance is low, the price paid for improving the results may indeed be very high. This was demonstrated very well by Parkyn (1959) who calculated that to reduce the failure rate from 32% to 16%, half of the students would have to be refused admission, many of whom would have succeeded. Nisbett and Welsh (1966), after showing the general validity of Scottish highers, found that though the failure rate could be reduced from 16% to 13% by raising the standards, this could only be done by excluding 89 students who would have been successful, 36 of them at Honours level!

Interview: Some Universities, Oxbridge for example, assess the student in an interview before admitting him. The reports about the validity of interview techniques have shown a correlation between ranking given at the interview to the examination performance, varying between '0' to .4 (Furneaux, 1961). Himmelweit (1950-51) found a correlation of exactly zero between the interview classification of the candidates applying for admission to a London college and their subsequent intermediate examination marks.

The defenders of the system claim that interview is related to other aims, e.g. competence in social relations, etc. (Ulrich and Trumbo, 1965). However, since the students are passed or failed on criteria other than competence in social relations, it is irrelevant to our theme. In any case there is no reason to believe an interview can assess these 'other aims' any better than it can assess academic ability (Furneaux, 1961).

Headmasters' Reports: They are still invited by many Universities but the various departments vary in the use they make of these reports. Reports like, "He shows promise as a left hand spin bowler, and is a great comfort to his widowed mother" are not uncommon (Drever, 1963) and cannot be of much use to selection bodies. The Scottish Council for Research into Higher Education (1936), however, found that teachers' estimates were as good predictors as high school grades! Himmelweit (1963) showed that the overall assessment provided by headmasters varies with the ratio of applicants to places; the average picture of the candidates becomes more glowing when places are in short supply.

Perhaps the headmasters' reports can be useful but the first step is to standardise the procedure of reporting.

To summarise, the selection procedures are far from satisfactory. The remark by Nichols (1966) is not so far from the truth. "..... after the applicants with low grades are eliminated, further discrimination must be carried out between the remaining highly qualified candidates. The selection committee can then make their decision on the basis of the remaining small difference in ..... high school rank; they can look at such data as interviewer's opinion or recommendation, or an autobiography, or they can flip a coin. All these are equally rated when judged from the view of later student performance".

Having dealt with the validity of the selection techniques employed at present, the next step is to consider other factors which have been investigated and found to have some relation with the academic performance.

For the purposes of this review they have been classified into two groups:-

1. Factors characteristic of the students.
2. Factors characteristic of the environment (University, faculty, college, etc.).

This distinction is of course artificial since the outcome depends on an interaction between these two kinds of factors (Furneaux, 1964). Stern (1962) sees this as the problem of consonance and dissonance between the needs of the student and what the college offers. The two types of factors should indeed be considered in their dynamic interaction. However, since most of the workers have in their studies considered these factors in isolation, the reviewer is forced to make a similar categorisation.

Factors Characteristic of the Student.

They can be further divided into two groups:-

(a) Intellectual

(b) Non-intellectual

Intellectual Factors

1. Intelligence: In this context intelligence refers to the I.Q. as measured by different intelligence tests. It is interesting to note that though one would expect, on commonsense grounds, a number of studies relating to I.Q. and the academic performance, not many have in fact been carried out, certainly not in the recent past. Perhaps this is a tacit acceptance that global 'G' is getting to be more and more an outdated concept.

Another reason could be that while the University students have a high I.Q. - around 130 (Vernon, 1961) - the intelligence tests of the conventional kind cannot discriminate very well in the upper ranges of the I.Q. (Heim, 1947).

Heim constructed a test called $AH_5$ for testing people of high grade intelligence (1956). Heim and Watts (1960) using this test found that the scholarship holders had a mean score of 44.4 and differed significantly from the failures who had a mean score of 36.9. Kelvin et al (1965) found that the mean scores on $AH_5$ for the students getting 1st, 2nd and 3rd class passes and the failure/drop-out group were respectively 44.89, 39.68, 40.36, 36.77 and 36.33. Unfortunately they do not give an F ratio, nor do they give standard deviations. It is impossible to say if these results are statistically significant. The mean scores of the 1st class holders do seem to stand apart from the rest. On the other hand, the mean scores of the failures are very close to those of 'Pass' students when it is between these two groups that discrimination counts the most from the point of view of wastage. This test, certainly from the partially published findings of Kelvin et al, does not seem to be a good discriminator at this level.

2. Aptitude Tests: Compared with I.Q. tests, aptitude tests have been much more popular. Ryan and Scanlon (1958) refer to an 'aptitude test movement' in American institutions. Most American colleges include an aptitude test in their normal selection apparatus (Fishman and Pasanella, 1960). Their greater objectivity and the standardised fashion in which they can be

administered and scored makes them appear preferable to the high school rank as a predictor. Himmelweit (1959) thinks that these instruments test the 'potential ability' of the student and can select out those students who got good marks in school because of cramming.

Once again these tests have a positive correlation with the outcome, but a low one. Fishman and Pasanella (1960) examined 62 studies and found an average correlation of .47. Eysenck (1947) took a random sample of 500 reported coefficients from his files, transformed each to its z value, averaged the z scores and found that the new average correlation coefficient was .527. He went on to say that less than 30% of the causal factors in college success can be measured by these tests.

Himmelweit (1951) carried out a study at the London School of Economics with 450 volunteers. Besides other tests, she used 10 tests of cognitive ability and 2 tests of cognitive achievement. The correlations of these test scores (combined) with the degree class, overall mark and 'special subject' score were .56, .64 and .55. These again were not very high correlations. She went on to say that the failure rate could be reduced from 15% to 3% if only the top 30% of the students ranked according to their aptitude test score were to be admitted. She did not, however, say how to fill up the rest of the seats!

Pilkington and Harrison (1967) compared the value of aptitude tests and G.C.E. results in a single survey. 'A' level results were found to be more predictive.

The aptitude movement is, however, becoming popular in Britain and a large experimental project sponsored jointly by Committees of Vice Chancellors and Principals is well under way (Butcher, 1968).

Non-Intellectual Factors

"The realisation ..... that aptitude testing movement had reached a point of diminishing returns in its ability to account for academic achievement touched off an extensive search for non-intellectual factors that would increase prediction .....". (Ryan and Scanlon, 1958).

Fishman and Pasanella (1960) point out that "..... in non-intellectual spheres we are far from arriving at an instrument which can be functionally scored within the context of mass preadmission procedures, and we can afford the luxury of trying out one or other of the techniques and ideas ...." This 'luxury' can, however, create problems for the reviewer who, to prevent confusion, has to exclude from his review some of the more 'luxurious' ideas or techniques.*

The non-intellectual factors can be broadly classified as follows:-

(a) Personal (b) Social

Personal factors may again be considered under the following headings:-

(a) Motivation: It is a standard practice for the writers of textbooks on psychology to view motivation as a major subdivision of psychological knowledge (Bindra and Stewart, 1966). The body of knowledge built around the concept is, however, very meagre. In general it may be said that motivation is concerned with the drives leading to a behaviour, goals and reinforcers which affect the goal directed behaviour positively or negatively. Experiments in the field have mainly been carried out with animals and that,

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* One example is the idea of Roy Schaffer (1966). Talent can be instinctualised and becomes a sexual and aggressive act. Use of talent becomes equivalent to masturbation fantasy - which can result in guilt feelings!

too, in connection with very simple drives like hunger. The problem of human motivation is very complex. Each drive may have a number of sources. Each behaviour may have a number of goals. It can be very difficult to summate the various elements involved (Miller, 1964).

Though it is possible to conceive that something called 'motivation' affects the academic performance of the students, it is almost impossible to translate this concept into measurable terms. One is, therefore, faced to measure much simpler things like 'interest' in the subject, vocational goals, etc.

There is no dearth of armchair comments regarding the relation between the different aspects of motivation and the academic performance.

"Lack of values for education associated with the lack of motivation was ..... a frequent cause of academic failure (Farnsworth, 1955). A group ..... primarily socially oriented ..... finds academic demands of college very onerous and ..... (is) likely to withdraw" (Freedman, 1956).

Slater (1957) put forward a few very interesting hypotheses. He saw the problem of motivation as an interaction between the needs of the student and his perception of the objectives of the curriculum.

He described four types of students: (a) those whose aim is a specific job, (b) those whose aim is a personal intellectual development, (c) those who come for a degree, and (d) those who have no goals but come for other reasons, e.g. to fulfil the demands of their parents. He described two types of college curricula: (A) those whose aim was to develop highly trained practitioners of a skill and (B) those whose aim was to develop well informed and intellectually resourceful individuals.

His hypotheses were that students with characteristic (a) will do well in curriculum (A), students with characteristic (b) will do well in curriculum (B). (c) will look for a course which is easy and will criticise unpopular degree requirement. (d) will not do well until some purpose and structure of the course becomes clear to him.

In 1961, Slater tried to test his hypotheses but unfortunately the study has been described very vaguely. The hypothesis of matching (a) to (A) and (b) to (B) shrinks in this study to a comparison of persistence rates in vocational oriented and 'liberal' oriented curricula!

Iffert (1957) found that 48% of the total drop-outs left because of lack of interest. Gekoski and Schwarte (1961) found that the withdrawal group claimed the course to be preparing them poorly for their vocational objectives, twice as often as the control group. Pervin (1966) found that lack of motivation (boredom and lack of interest apathy) was the main reason for leaving the course amongst the drop-outs who had left for non-required reasons. In Britain Hopkins et al (1956) found that those students who claimed to have come for 'social reasons' failed more. All these studies show that the students who do not have an interest in academic activities do not do well. There is, however, a difficulty about interpreting retrospective studies of this sort. If a student is questioned after he has left the course it is not too difficult for him to put down "lack of interest" as his reason for failure or withdrawal.

There have been a few prospective studies. Value placed on the concept of academic achievement compared to other kinds of achievement added a statistically significant contribution to a regression analysis, with success as a criterion (Cole and Miller, 1967 ).

In another prospective study (Gelso and Rowel, 1967) persisters scored significantly higher in curricular adjustment, maturity of goals and level of aspiration.

Some idea of motivation can be achieved by the clarity of a student regarding choice of a major or special subject. Wiggle (1966) found that those who could not make a choice of subject did worse than others. On the other hand, Fulmer (1956) found that the students who changed their major subject in the course did better than those who did not.

Another related problem is the definiteness of vocational orientation. Marshall and Simpson (1943) found that those who could not make up their minds during the four years did worse than the others.

Eckland's follow-up study (1966) also gives an idea about the importance of motivation. He found that the students who were not supported financially by their parents dropped out more but, having dropped out, there was a greater chance of these financially unsupported students coming back to college compared with those who had received financial help.

Psychoanalytic literature abounds in remarks (Levenson, 1966) that when the students come to Universities because of pressure from parents but not from their own choice, they do not do well. Rust and Ryan (1955) however, failed to show a relation between parents' attitudes and academic achievements.

Inga Maclay (1968) found no relation between a student's attitude towards coming to University and his performance.

To summarise, (a) achievement motivation has been tested by less than ideal techniques, (b) prospective studies give some evidence of relationship of interests and goals to academic performance, and (c) retrospective studies may lead to wrong interpretations.

(b) Personality: There is extensive literature on the relationship between personality factors and 'drop-out'. Some of these studies are purely impressionistic but in others the results are based on various personality tests. The sheer variety of tests, however, makes it very difficult to compare the findings and to extract some common meaning. Amongst others, the following tests have been used in the American studies: M.M.P.I. (Grace, 1957), Minnesota Counselling Inventory (Brown, 1960), A.C.L. Inventory (Heilburn, 1962), Guilford's Inventory (Jones, 1962), Bell's Adjustment Inventory (Vorreyer, 1963), Rorscharch (Osborne et al, 1950), Taylor's Manifest Anxiety Scale (Bendig, 1958) and the California Psychological Inventory (Astin, 1964).

Marsh (1966), after reviewing the literature on the subject, prepared the following 'identikit' of a 'drop-out':

(He) is "rigid, fearful of change, less willing to accept the responsibilities of adult independence, lacking internalised goals and somewhat of a social misfit. A drop-out feels easily and hopelessly defeated when faced with the prospect of possible failure and disappointment". In other words, he is "inferior"!

Psychoanalysts have made attempts to go deeper into the problem. Erikson (1956, 1958 and 1964) talked about the 'identity problems' of an adolescent. Greenson (1954) said that most University students were still adolescents and, besides facing 'identity problems' peculiar to this age group, they faced the additional burden of learning new skills, physical separation from parents, etc. For some students the price paid for education might be too much in a psychological sense and they might drop out. Snyder and Kaufman (1963) made similar remarks.

Problems of 'identification' or 'counter identification' with parents have also been pointed out by some workers. Eckland (1964) invoked 'identification problems' to explain why children of drop-outs drop out more often. Greenson (1954) raised the banner of 'counter identification'. He went on to say that some students, to prove that they were individuals in their own right, might deliberately adopt characteristics which were not liked by their parents. The son of a successful graduate might, therefore, leave the University.

Kubie (1965) made a very interesting comment. He said that students might be wanting to leave education even at school level but could not do so because of their inability to assert themselves. Once at the University, being older and more confident, they dropped out. He quoted St. Augustine: "Innocence of children has more to do with the weakness of their limbs than with the purity of their hearts". Such remarks, though interesting, can only serve as hypotheses which need to be tested in properly designed studies. Surely some of the academically successful students may also have identity problems, or are engaged in a war of identification or counter identification with their parents! It is still to be proved that failures and drop-outs have more of these problems.

In Britain the Eysenck Personality Inventory (1964) or its earlier version, the Maudsley Personality Inventory (1959), have very often been used in research on academic performance. This is indeed fortunate as comparisons can be made. Very briefly, the test measures dimensions of neuroticism (N), which is the "liability to neurotic breakdown under stress" and extraversion (E), which refers to "the outgoing, uninhibited proclivities

of a person" (Eysenck, 1959). Ojha et al (1966) point out that, since 'N' and 'E' are normally distributed in student populations and the instrument is based on a theory of personality from which predictions can be made and tested, there are sound reasons for using the test with the students.

Accepting Eysenck's theoretical framework and his postulates (Eysenck, 1957) that introverts have poor reactive inhibition and neuroticism is accompanied by high autonomic drive, Lynn and Gordon (1961) put forward the following hypotheses:

(a) Introverts (being low on reactive inhibition) will stick to their tasks longer than extraverts and, since reactive inhibition has an impairing effect on efficiency of learning (Franks, 1957), introverts will also be more "efficient" in learning compared to extraverts with the same intelligence.

(b) Neuroticism (being related to high drive) will increase the speed of learning as well as efficiency for simple tasks.

They took 'progressive matrices' as the 'task' and a vocabulary test to investigate efficiency. They found that (a) introverts showed more persistence and (b) neurotics worked faster but the relationship between neuroticism and scores on progressive matrices was curvilinear. To explain this curvilinear relationship they invoked Yerkes Dodson's Law (1908) which states that after an optimum point, any increase in drive level would lead to diminished performance.

Biggs (1962) criticised Lynn and Gordon's work both for its theoretical foundation and its design. He considered that it was far from proved that

neuroticism had no relation to intelligence and in his view Lynn and Gordon's results could be easily interpreted to mean that "intelligent students can utilize their anxiety more efficiently than unintelligent students".

Furneaux (1962), in his now famous work, tested the relationship of 'N' and 'E' to performance in a University setting. He related the M.P.I. scores of 91 Engineering students to their academic achievement in various subjects. The criterion for academic achievement was an average mark in those subjects which, after a centroid analysis, seemed to have most of their variance explained by a common determinant. To put it simply, only those subjects were included which measured a "common examination passing ability". The results were as follows:-

| Category | Failure rate |
|---|---|
| Neurotic introverts | 21% |
| Neurotic extraverts | 36% |
| Stable introverts | 26% |
| Stable extraverts | 61% |

It is obvious from these results that neuroticism and introversion favour good performance. The results are in a way a vindication of the standpoint of Lynn and Gordon.

Furneaux, however, also found that for other subjects like "Engineering drawing" which were not included in the criterion for the above mentioned exercise there was no relation between 'N' and academic performance.

He, too, invoked the Yerkes Dodson Law to explain this discrepancy. He claimed that Engineering drawing was a 'complex' subject and the drive level of neurotics when appearing for this subject might have gone beyond the optimum point. He also found 'evidence' for the supra-optimal drive in the excessive sweating, tremor and lack of co-ordination in students appearing for this subject!

With all due admiration for Furneaux's work, it is difficult to go along with him all the way. How did he find that "Engineering drawing" was more complex? How did he deduce supra-optimal drive from crude indicators like sweating and tremor? Assuming that these were the best indicators available, how can his 'evidence' be accepted without his giving comparative findings about the sweating, tremor, etc. the students had when they appeared for other examinations?

Kelvin et al (1965) and Wilson (1968) could not confirm Furneaux's findings. It may be said in Furneaux's defence, however, that these workers took an <u>average performance in all the subjects</u> as the criterion and therefore their results are not strictly comparable to those of Furneaux who took only those subjects which reflected a "common examination passing ability".

The M.P.I. and E.P.I. have both been criticised as tests of personality. Significant changes on recovery from psychiatric illness were shown by Coppen and Metcalfe (1965) and Ingham (1966) for the M.P.I., and by Knowles and Kreitman (1965) for the E.P.I. Ojha et al (1966) found that neuroticism scores were not stable in the case of students who attended the Student Health Centre for psychological reasons. <u>Illness factors therefore seem to contribute to the 'N' score</u>.

Kelvin et al (1965) reported changes in relation to academic performance. The E.P.I. was given twice to a group of students, once when they came to University and once 2½ years afterwards. For the students who gained firsts the 'N' score fell from 28.42 to 25.64. For the students who failed or dropped out the score went up from 23.84 to 27.68. If one remembers that the changes in psychological disturbance are related to changes in 'N' score one can extend the argument and say that an increase in 'N' score in the failure group is related to increase in psychological disturbance, and a decrease in 'N' score in the successful group is related to a lowering of psychological disturbance. The question then arises that if it is the changes in the psychological disturbance element of the E.P.I. which are related to academic performance, why not use a test which directly measures psychological disturbance rather than use the E.P.I. whose claims of being a pure personality test (which by definition should be more stable) are in doubt.

Another theme which has been followed up is the relationship of 'aggression' and academic performance. Roth and Myersberg (1963) wrote that the non-achievers were very susceptible to disparagement and reacted to this by becoming uncontrollable and impulsive. However, the "impulsive expression in these students is directed inwards". Roth and Puri (1967) used Rosenzweig's test on school children and found that achievers had externally directed hostility and non-achievers had internally directed hostility. On the other hand Eliot et al (1965) found that drop-outs were more extrapunitive! A reference has already been made to the work by Rose and Elton (1967) and their novel classification. Using a sophisticated multiple discrimination procedure (page 8 ), they found that

the drop-outs, besides other things, were actively hostile while the probation persisters (i.e. poor academic performance group) had inward directed hostility. This study, therefore, shows different hostility patterns in the students who have a poor academic performance but stay on, and those who drop out in spite of doing well at examinations.

Use of the Omnibus Personality Inventory (1962) needs a special mention. This Inventory has been specially prepared for University students. Snyder (1966), using the O.P.I., brought out some interesting findings, e.g. students low on impulse expression do better and students high on creativity leave certain courses in high numbers compared to others. Walton (1966), using part of the test with medical students at Edinburgh, found that "thinking introversion" was related to good academic performance.

To summarise:

(a) There is some evidence of relationship between 'N' and 'E' of the E.P.I. to academic performance. The test, however, is contaminated with elements measuring 'psychological disturbance'. The present author puts forward the argument that quite possibly what is related to academic performance is that element of 'N' which tests 'psychological disturbance' rather than the more permanent personality attributes.

(b) Aggression, self-directed or outward-directed, may differentiate poor performers in examinations from those who drop out voluntarily.

(c) Identity problems may be related to academic performance. It is yet to be proved that they do not exist as much in the students who perform well. How to measure 'identity' is another problem!

(c) Emotional Disturbance

Psychological disturbance in University students has been studied by many workers but in this section reference will be made only to those studies which relate emotional disturbance to academic performance and wastage.

As early as 1933 Angell claimed that 10-15% of the Yale College students suffered from emotional difficulties severe enough to interfere with their effectiveness and happiness. Farnsworth (1959) claimed that more than half the students who left college did so because of emotional disturbance.

In Britain, Macklin (1951) thought that emotional disturbance was one of the main causes of student failure at Aberdeen. Pemberton (1948), Henn (1951), Parnell (1951) and Dale (1954) made similar statements. Concern has also been expressed in other countries, like Australia (Schonell et al, 1962; Wright Short, 1967), Taiwan (Yeh et al, 1966) and Finland (Kaila, 1958).

Malleson (1965) dismissed the idea that the University population was in any way more heavily loaded with psychologically unstable than the general population. However, according to him, while a distressed apprentice or a farmer's boy could carry on his normal duties without significant deterioration, emotional distress would certainly interfere with a student's work; in most cases it would prevent effective study. Psychological disturbance is, therefore, of special significance to a University student because of the nature of his work. Elsewhere Malleson (1963) attempts a classification of psychological distress in relation to

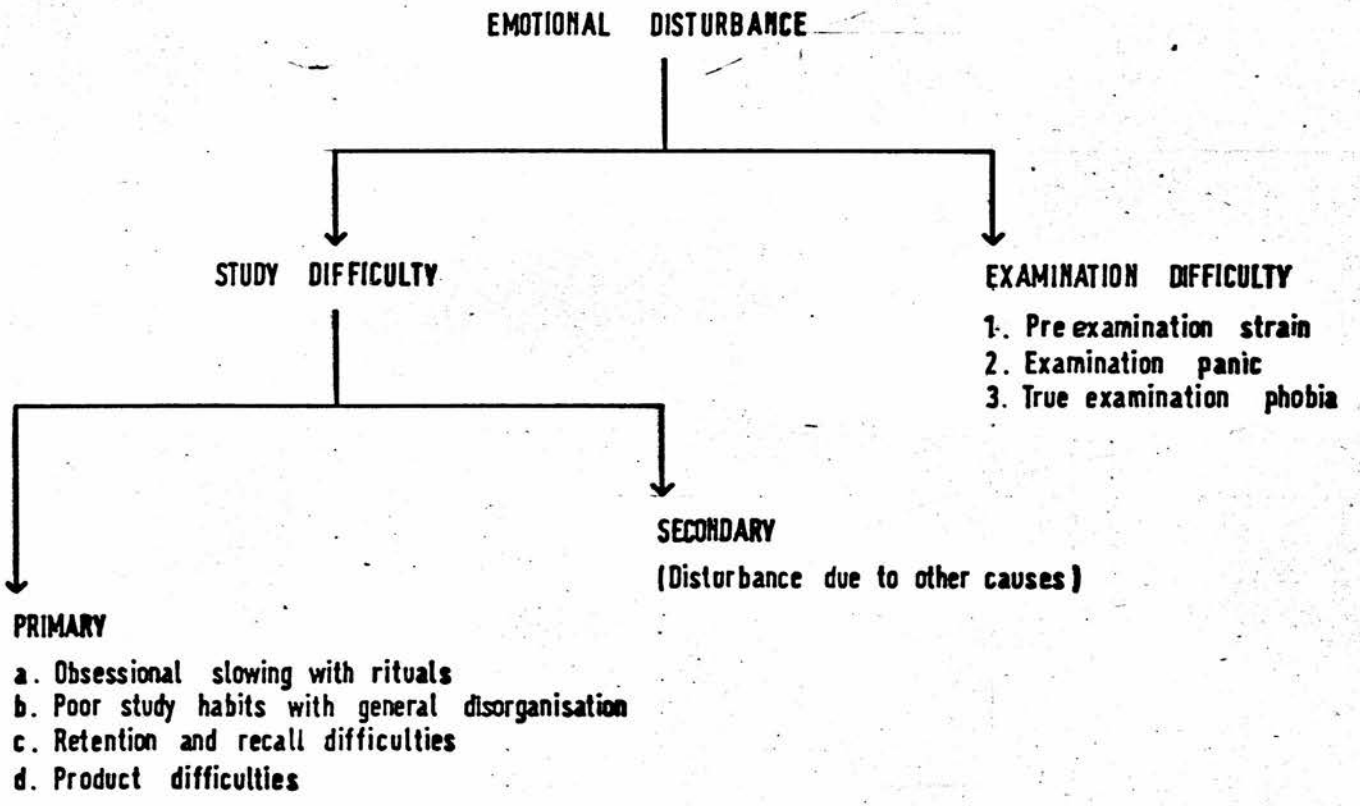
academic performance. The classification is 'clinical' and in the present author's opinion, very useful in practice. His classification may be summarised as in Figure 1.

In spite of the concern shown by clinicians, the reports of research into the problems are conflicting. There are three different kinds of reports:-

1. Psychological disturbance is related to poor performance.
2. Psychological disturbance is not related to poor performance.
3. Psychological disturbance is related to better than average performance.

1. Psychological disturbance related to poor performance: Parnell (1951) reported that mental illness was responsible for half the illness, serious enough to cause absence for at least one term. Read (1954) found that out of 131 students who attended an experimental psychiatric service at the London School of Economics, 57 had "study difficulties". Malleson (1965) found that at University College, London, non-achievers had a disproportionately higher number of students with severe psychiatric disorder. Davidson and Hutt (1964) found that though the psychiatric patients got as many 'firsts' as the controls, they had less 'seconds' and 'thirds'. Still (1966) found that compared to the general population, a higher proportion of the psychologically ill failed, remained absent, withdrew or got an Aegrotat. McCracken (1967) had similar findings. Spencer (1958) found that out of the 100 patients he studied, 46 had suffered from academic revoke, by which he means "..... running away from essay writing, ..... or examination itself".

FIGURE 1


EMOTIONAL DISTURBANCE
STUDY DIFFICULTY
EXAMINATION DIFFICULTY
1. Pre examination strain
2. Examination panic
3. True examination phobia
SECONDARY
(Distorbance due to other causes)
PRIMARY
a. Obsessional slowing with rituals
b. Poor study habits with general disorganisation
c. Retention and recall difficulties
d. Product difficulties

One of the most thorough studies carried out in this field is that by Lucas, Kelvin and Ojha (1966), which has been referred to before. It was a prospective study and they followed up the students for three years. Besides studying emotional disturbance they also examined the influence of I.Q., personality and certain social factors. A 25% random sample (198 students) of the 1960 entry to University College, London, was taken. The students were classified as: (a) successful, (b) delayed, if they took more than three years and (c) wasted if they left the University before completing the course. Psychiatric findings were collected through: (a) clinical records, (b) questionnaires, (c) tutors' reports and (d) replies by wasted students to follow-up questionnaires. They found that: (a) out of the 32 'wasted' students one third were seriously disturbed and two thirds were disturbed to some degree; (b) 19% of the 'wasted' or 'delayed' students were referred to a psychiatric agency outside the University Health Service as compared to 3.5% of the 'successful' group. This otherwise very useful study may be criticised on the following grounds:-

(a) As the psychiatric data was derived from different sources, the definition of psychiatric disturbance could not have been uniform.

(b) Percentages are worked out from very small numbers. Nineteen per cent of the 'wasted' students and 3.5% of the 'successful' students actually work out as only 8 students each! Much larger samples are required before the percentages can be interpreted with confidence.

Kidd (1963) investigated the prevalence of psychological disturbance in the total cohort joining Edinburgh University in 1961. The study was prospective and comprehensive. One of the aims was to examine the relation

between emotional disturbance and academic performance. The criterion was the examination results in the June examination (this unfortunately was a poor criterion because the 'failures' are really decided in the September resit). He found that:-

(a) For women declared illness was related to poor performance.

(b) Diagnosed formal psychiatric illness was related to poor performance, both for men and women.

(c) Out of the 11 students who withdrew before the June examination, 6 had diagnosed psychiatric illness.

Nicholi (1967) reports on a long-term study carried out at Harvard and which is still in progress; 1,454 students who dropped out in 1955-60 were followed up. A drop-out was called 'psychiatric' if he consulted a psychiatrist one or more times before leaving the college and was given a specific diagnosis by the psychiatrist. Two control groups were taken: (a) a random sample of the undergraduate population and (b) a random sample of 'non-psychiatric' drop-outs. The following results were obtained:-

1. 38% of all drop-outs were psychiatrically ill compared with 10% of the general population sample.
2. 7% of 'psychiatric drop-outs' were psychotic and 36% were neurotic.
3. Depressive reaction (neurotic) was the commonest single diagnosis.
4. The larger the gap between academic 'potential' (as measured by entrance tests), academic 'status' (as measured by ranks achieved in the college examination), the greater the chances of dropping out for psychiatric reasons.

The author does not give a breakdown of the diagnostic categories in the control group of undergraduate students. His claim that depressive reaction was a 'causative' factor in dropping out is unacceptable because it could easily have been a 'result' of the difficulties students might have experienced before going to a psychiatrist.

Ryle and Lunghi (1968) tried a novel approach. They tried to study the interactions of intelligence, personality and psychiatric difficulties and, on the basis of this, divided the students into seven categories. They found that:-

(a) Students who were psychiatrically ill and had academic difficulty had a high performance on Nufferno test but had a low stress gain, i.e. they had a good ability but the efficiency was not increased under mild stress, as would be the case with normal subjects.

(b) Students who were not psychiatrically ill but had academic difficulty showed low performance on Nufferno test but had high stress gain. This means that though they had low ability, their performance could be improved under stress.

The implications are clear; students with psychological disturbance will not improve on their performance when 'pushed' while the students with 'purely academic' difficulty will.

The general evaluation of these studies is given later.

2. Psychological disturbance not related to academic performance:

Mercer (1941) found that "there have been no difficulties given as a reason for leaving college that have not been encountered by students in ..... graduating groups". Raphael (1936) and Davie (1956) did not find any

difference in academic performance of psychiatric patients and non-patients.

Davidson et al (1955) concluded that 'disturbed' Oxford graduates did as well as others. Grant (1961) claimed that entrants to a Welsh College who had serious psychological disorder acquitted themselves satisfactorily in the academic field. Malleson (1957) claimed that the pass rate of students consulting his service with pre-examination strain was much the same as the college average.

Kidd (1963) found that for men reported emotional disturbance had no relation to academic performance. Diagnosed 'minor' psychiatric disorder had no relation to academic performance either for men or for women.

3. Psychological disturbance related to better than average academic performance: Greenson (1955) said that "Often the best students pay the highest price .....". Kubie (1965) claimed that "..... people who are deeply sick in subtle ways tend to energize themselves to productive activities".

Malleson (1959) found that for medical students psychological strain occurred more in the students who were in the 'honours' and 'borderline' categories while those who had average performance rarely reported disturbance. For 1948-51 entry to University College, London, Malleson (1965) actually found a negative correlation between mild psychiatric disturbance and academic performance.

These conflicting reports can be due to a number of reasons:-

Problems of 'case' definition: The definition of a 'case' varies from investigator to investigator, clinic to clinic and from one context to another. There is no complete agreement on diagnostic categories and the boundaries between the different categories are not sharp. It is likely that in the different studies mentioned in this section the investigators might, to a certain extent, be talking about different things.

The problem of 'design' of the investigation: The retrospective studies may pick up the "secondary emotional disturbance" following failure or drop-out. On the other hand the studies in which 'consultations' in the clinic are taken as the indication of emotional disturbance are likely to under-represent the role of emotional disturbance. Some students might be disturbed and fare badly in the examination as a result of this disturbance but are not counted because they do not go to the clinic. Ideally, from the point of view of prediction, one would like a prospective study where the psychiatric state of the total population is judged at entry but no British study has attempted such an exercise, presumably because of the amount of effort involved.

The 'efficiency promoting' influence of emotional disturbance may be masked if in a study all successful students are 'lumped' together (as they usually are). Malleson hypothesises what may be described as a curvilinear relationship between emotional disturbance and academic performance, and this can be tested by keeping the 'very successful' students separate from the 'average' students.

(d) Other Personal Factors

1. Age: While some studies report that younger students perform better than older students (Cooper, 1928; Pope, 1931; Summerskill and Darling, 1955; Barnett et al, 1968) others report that both younger and older students do better than agerage aged students (Garnett, 1935; Pierson, 1948). However, contrary findings have also been reported (McCracken, 1967).

2. Sex: Women have been reported to show better performance than men (McCracken, 1967; Walton, 1966). No sex differences in academic performance were, however, found by Iffert (1957) and the Robbins Report (1963).

3. Study Habits: Thoday (1957) investigated the study habits by asking students their study schedule on the day before interview, and discovered a trend towards a positive relationship between the 'number of hours put in' and the academic performance. Jones (1955) found that better students use a wider variety of study methods. Gehmann (1955) found, on the other hand, that successful and unsuccessful students display 'good' and 'bad' study habits with similar frequencies. It may be pointed out, however, that hours of study cannot throw light on the student's concentration at his work. A lot has yet to be understood about what are 'good' and what are 'bad' study habits.

4. Religion and Religious Performance: Summerskill and Darling (1955) found that Jewish students did better than the students belonging to other religious groups. He ascribed this to the high value placed on educational achievement in a Jewish culture.

McCracken (1967) and Maclay (1968) found that high religious participation was related to good performance. Hopkins et al (1957) found no such relationship.

Social Factors

(a) Socio-economic background: "College counselling experience suggests that a student's economic and social background affects his adjustment to the environment of a given college and is, therefore, a factor in attrition (Summerskill, 1962).

Eckland (1964) pointed out that "The relationship between socio-economic status and persistence is not economic but involves differences in motivation and value orientation which influence the student's capacity to take advantage of his intelligence and opportunities".

Wolfe (1954) thought socio-economic status affected the probability of enrolling in a college but once having entered the chances of a student's success now depended more on his ability than on his background.

Once again, there is conflict in the theoretical position of different workers. Research findings are also unfortunately equivocal.

Children of professional fathers were found to show a better performance than the children of non-professional fathers (Garnett, 1935; Astin, 1964). Lucas et al (1966) found that children from lower social classes showed greater wastage. No relationship between social class and academic performance was found by Maclay (1968). Better than average performance amongst students from lower socio-economic status was found by McQuarry (1954), Hopkins et al (1957) and Marris (1964).

An excellent study is that by Sewell et al (1967) who found that poor socio-economic status had a negative effect on higher education at all levels - planning, attending colleges and graduation - more so for women.

The educational level of parents has also been investigated. Farnsworth (1955) said that children of more educated fathers had a lower failure rate. McCracken (1967), in Britain, found no relation between graduate status of the parents and performance. Hopkins et al (1957) found higher failure rates in the children of parents who had been to University.

(b) School: The type of school has been related to future performance at University. The Robbins' Report (1963) shows that there is a greater wastage in students from boarding schools as compared to those from day schools.

Marris (1964) found that there was no difference in the performance of students from 'public schools'* and grammar schools. On the other hand a report from Cambridge University Sociological Society (1955) shows that direct grant and grammar schools obtained proportionately twice as many firsts as H.M.C. independent schools. McCracken (1967) had similar findings.

(c) Nationality: McCracken (1967) found that British students performed better than foreign students. Craig and Duff (1961) found that students with the Scottish certificate (who would mostly be Scottish) had a worse performance than students with the G.C.E. Walton (1966) found that in Edinburgh University Medical Faculty, Scots did the best, English were in the middle rank and foreigners did the worst.

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* In the sense the term is used in England.

(d) Family: Jones (1955) comparing the probation students (i.e. poor performers? with matched 'superiors' found that the former came from homes which were tense and disturbed, and 'not quiet'. They had less understanding with their fathers. They kept their problems to themselves and did not discuss them at home. On the other hand, parental harmony, childhood discipline and childhood happiness did not have any relation with academic performance in studies by Hopkins et al (1957) and Maclay (1968).

To summarise, hardly any social factor has been consistently shown to have a definite relation with performance. It is difficult, however, to believe that performance in such a sensitive area as higher education can be independent of the effects of social pressures and cultural values.

Factors Characteristic of the (University) Environment

Until comparatively recently very little research was done with a view to relating the academic performance of a student to the complexities of factors in the environment. This is probably due to the fact that the workers in this field - who most often happen to be on the teaching staff - are themselves a part of the environment and self-examination is not easy!

Dunham (1966) divides the University environment into (a) formal organisation and (b) informal organisation. The formal organisation refers to "..... all those policies and practices adopted with a view to attainment of educational objectives, i.e. the curriculum, departmental structure, examinations, etc. The informal organisation refers to friendship groups, social activities, etc.

Studies related to formal organisation: The role of examination procedures and departmental policies in determining wastage rates has already been dealt with. 'Methods of teaching' have been blamed by many, but hardly any research has been carried out relating this factor to academic performance. A study carried out by Walton (1966) is, however, a refreshing exception. He investigated the relative merits of lecture teaching and seminar teaching as methods of psychiatric instruction for fifth year medical students. The students were allotted to the two courses on a random basis. He found that the two methods made no difference to the factual knowledge or clinical skills of the students, but the attitudes of the students towards psychiatry and its practice were more positive in the students taught by the seminar method. For another group of students he found that combined teaching (i.e. lectures + seminars) was related to better performance in psychiatry examinations.

Reference has already been made to the study by Snyder (1966) at the Massachusetts Institute of Technology. The study demonstrated that students high on creativity and originality left certain courses in high numbers compared to other courses. He also found that the students who stayed on in courses demanding practical application scored low on the 'intuitive scale' of the Myer Briggs Inventory while those who stayed on in theoretical courses scored high on the 'intuitive scale'. 'Intuitive' students, therefore, matched well with the theoretical courses.

Studies have also been carried out showing the relationship between the student's perception of the formal organisation and his performance. Gekoski and Schwartz (1961) in a retrospective study found that students who withdrew complained more often about poor teaching facilities when

compared with students who stayed on. Slocum (1956) found that the 'withdrawees' complained of poor contact with teaching staff more often than the 'stayers'. Retrospective studies of this type can, however, lead to biased answers.

Studies related to informal organisation: An important study in connection with the effect of informal organisation of the University to the academic performance of the students is that by Nastair (1963). 1,782 Berkely Freshmen were assigned to six different dormitories on a non-preferential basis. The failure rate in the six dormitories varied from 0% to 56%!

There is some evidence that the students who are lonely have less friends and take less part in extracurricular activities, and show a poorer performance than those who are more social and active (Slocum, 1956; Lucas et al, 1966; Maclay, 1968). Hopkins et al (1957), however, found no such evidence.

The place of residence has been related to academic performance by some workers. Marris (1963) found that those living in halls of residence showed fewer 'good' results but also showed fewer 'failures'. McCracken (1967) also found less 'failure' in the students who were in halls of residence. Acland and Hatch (1968) found no relation between residence and academic performance.

Stern (1962) tried to study the relationship between students and their environment in a dynamic fashion. The environment was measured by College characteristics index and the students' needs by Activity index. The reports on these measures are inconclusive. Younge (1965) criticised the scales by saying that they overlapped to a great extent and hence were not tapping independent dimensions.

Astin and Holland (1961) also prepared an 'environment assessment technique', which on factor analysis was found to measure 6 dimensions: affluence, size, private vs public, masculinity, realistic emphasis and homogeniety of environment. No conclusive evidence about the usefulness of the scale is yet available (Astin, 1964).

## Chapter 3

## TECHNIQUES USED IN STUDYING WASTAGE

The previous chapter dealt with the factors related to student wastage, failure, drop-out, etc. Another way of looking at the literature is to take a general overview of the methodology used in the various studies.

The following different types of studies have been carried out:-

(a) Enumerative studies: The aim of some studies is limited to counting the number of failures and drop-outs and carry out simple analyses like inter-faculty and inter-University differences. The U.G.C. surveys are examples of this kind and the way in which they highlight the problem and point towards the inadequacies of definition and classification has been discussed before.

(b) Descriptive studies: Some studies are content to describe the characteristics of the student who left the University. The studies by Iffert (1957) in the U.S.A. and that by Hopkins et al (1957) in Britain are examples of this kind. These studies are very useful in understanding the student's point of view and their perception of the difficulties they had to face at the University. Such studies become more valuable when a control group of successful students is also examined in a similar fashion, as indeed was done by Hopkins et al.(1956). (The response rate to their study was, however, very poor.)

The difficulty arises when a 'causal' interpretation is given to the findings in such studies. Reference has already been made to the fact that such studies may pick out emotional upheaval which follows failure or drop-out (page 37 ) and the 'drop-out' group will, therefore, show more emotional disturbance than the 'control' group. A causal interpretation given to the finding will blow up the role of emotional disturbance as a factor contributing towards wastage.

(c) Predictive studies: These aim to predict the group of students who are at risk of failing or dropping out. Some investigators are interested in prediction so as to improve selection procedures, and others so that they could help the students at risk. The study carried out by Lucas et al (1966) was a predictive study. It need not be over-stressed that such studies should be prospective. A retrospective analysis of "attitudes towards coming to University" for example, may produce biased responses (drop-outs being more likely to report negative attitudes towards coming to University).

Some studies attempt to increase the predictive power by making a joint use of a number of factors which were found to have significant relation to the outcome. Vorreyer et al (1963) claimed 80% correct prediction by using a 'prediction scale' composed of a number of factors!

A study carried out by Wilson (1968) is one rare instance in the British field in which a 'prediction scale' was attempted. His conclusion, however, that he could make 81% correct prediction is a gross overstatement. Since the study is a recent one it may influence the research workers interested in preparing prediction scales and make them

unduly hopeful. The study, therefore, deserves a more detailed criticism:

(1) The sampling was poor. Instead of taking a random sample of the population the investigator took a sample each from the students who were: (a) above average and (b) failures at a previous class examination. The 'average' student was not included. It is a statistical fact that even where the overall correlation between a predictor and criterion is low, but positive, the students at the two ends can be predicted with good confidence. The misclassification occurs in the middle ranks. The author had already biased the result in his favour by taking the students whose ability in examination had been demonstrated to be 'above average' and 'below average'.

(2) The students were divided into four groups: 'good', 'weak', 'resit pass' and 'failure' according to their performance in the first year degree examinations; "81% correct prediction" was found when 'good students' were compared with all the rest combined. This may be of some academic interest but is not of much practical use; what is really needed is a sharp distinction between 'failures' and the other groups, rather than a division between top students and the rest.

It may also be mentioned that in none of the studies which have concentrated on preparation of prediction scales was there ever an attempt made to carry out a validation of the scale (either prospectively or by cross-validation procedures).

(d) Follow-up studies: Some workers follow up the drop-outs and a control group of graduates to examine the possible 'harm' done to the drop-out. Studies by Pervin (1966) and Eckland (1966) in the United States are excellent examples of this kind. Such studies are, however, very difficult to carry out and are very expensive. Moreover, the students disperse all over the country and it is difficult to keep a track of their addresses. This leads to a poor response rate. When the response rate from the drop-outs is much poorer than that from the graduates the interpretation of the results becomes even very difficult. It is difficult to rule out that the drop-outs who are not doing well will be less keen to fill up questionnaires. The point has been discussed before in connection with the follow-up study by Kendall (1964).

(e) Action research: It would be reasonable to believe that after 45 years of research some action might have been taken in the light of the findings in various studies. It does not, however, appear to be so. Selection procedures have hardly changed and examination procedures are not different from those used when in medieval times Oxford and Cambridge started examining the students. The move by Nisbett (1966) to institute an 'early warning system' at the Science Faculty in Aberdeen University can be regarded as an example of 'action research'. He did find that the failure rate went down after the system was adopted though he does not claim that the new system was the main cause of the lowered failure rate.

Summary

It is well to remind oneself that in spite of a long history of research in the field, the attrition rates have not changed (Summerskill, 1962).

An attempt is made in this review of literature to show the complexity of the problem which perhaps is the main reason for a lack of correspondence between the 'input' and 'output' in the field. The following facts stand out:-

1. The causation of wastage is multidimensional. The outcome is determined by the interaction between the various educational, social and psychological assets and liabilities a particular student brings with him, and the characteristics of the college, the faculty or the University. There is no single main cause of wastage.
2. The multiple causation can lead to conflicting results in different studies if, while studying one factor, the other factors are not controlled. The alternative approach to look at all the possible factors, i.e. educational, motivational, psychological, social, etc., has not been tried out much.
3. Though a large number of factors are now known to be related to student wastage, many of these factors (motivation, for example) defy an attempt at an objective measurement.
4. The very criterion against which the factors are to be measured is poorly defined. The validity and reliability of examination procedures is in doubt. Built-in wastage rates complicate the matter even further.

## Chapter 4

## AIMS OF THE STUDY

The general aim of the present study has been described before. To recapitulate, it was "to predict those at risk of failing or dropping out so that the necessary help could be given as early in their career as possible". The aim was limited to the prediction of academic performance during the first year only.

The review of literature shows that to make a successful prediction one would need to cover a wide field. The more specific aims of the study were, therefore, as follows:-

1. To examine if certain specially selected, operationally defined, scholastic, social, motivational and psychological variables, characterising the students at the time of entry to University, were related to the academic performance.
2. To examine if certain specially selected, operationally defined variables connected with the student's experience at the University were related to academic performance.
3. To examine if, by using certain variables in combination, a prediction scale could be constructed, which increased the power of predicting a future failure or drop-out.
4. To examine if, by using a method of cross-validation, the robustness of such a scale could be demonstrated.
5. A subsidiary aim was to carry out a preliminary description of the cohort in terms of some of the items included in the investigation.

The Hypotheses

Some of the factors chosen to be included in this inquiry had been thoroughly explored by other workers and had been shown to have a more or less consistent relation with academic performance. This provided an opportunity to construct some specific directional hypotheses. Some other factors chosen for the inquiry had either not been so thoroughly explored or the evidence regarding their relation with academic performance was of a conflicting nature. The hypotheses based on these factors were, therefore, less specific and non-directional. The various hypotheses are given below, classified under appropriate headings.

Factors Characteristic of the Student at the Time of Admission

A. Social and Demographic

Hypotheses:

1. Males differ from females in their academic performance.
2. Age is related to academic performance.
3. Unmarried students differ from married students in their academic performance.
4. Nationality:
   (a) Nationality is related to academic performance.
   (b) Foreign students have a poorer performance than British students.
   (c) Scottish students have a poorer performance than the 'Other British' students.
5. Religion:
   (a) Those who practise a religion, and those who do not, differ in their academic performance.
   (b) The degree of participation in religious activities is related to academic performance.

6. The academic performance of students from broken homes is worse than that of students whose parents are living together.

7. 'Only' children differ in academic performance from those who have siblings.

8. Social class:

   (a) Students from different social classes differ in their academic performance.

   (b) Students whose father's occupation is manual differ on academic performance from students whose father's occupation is non-manual.

9. Educational achievement of the parents is related to academic performance.

B. Motivational Factors

Hypotheses:

1. Students expressing a favourable attitude towards coming to University have a better academic performance than those not in favour.

2. Father's attitude to the student coming to University is related to academic performance.

3. Mother's attitude to the student coming to University is related to academic performance.

4. The students admitted to a course which they put as their first choice when applying to University have a better academic performance than those admitted to a course which is not their 'first choice'.

5. Students who have decided upon a future career differ in academic performance from those who are not 'committed'.

C. Educational Factors

Hypotheses:

1. The students with G.C.E. have a better academic performance than those with S.C.E. only.

2. The students with a high school achievement score have a better academic performance than those with a low school achievement score.

3. Type of school is related to academic performance.

4. Students who were financially supported by their parents whilst at school differ in academic performance from those who were supported by the State.

5. Students who were 'boarders' at school differ in their academic performance from those who were 'day pupils'.

6. Students from large schools differ in their academic performance from those who come from small schools.

7. Satisfaction with academic performance at school is related to the future academic performance at University.

8. Interest taken in sporting activities at school is related to academic performance.

9. Interest taken in clubs and societies at school is related to academic performance at University.

D. Psychological Factors

Hypotheses: 1. "Personal Disturbance score" is related to academic performance.*

2. The ease with which personal problems can be discussed at home is related to future academic performance.

3. Happiness at home is related to academic performance.

4. Total Hostility and Direction of Hostility.*

   (a) Total Hostility is related to future academic performance.

   (b) Direction of Hostility is related to academic performance.

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* These hypotheses are based on two objective, psychological instruments, i.e. the Personal Disturbance Scale (Foulds and Hope, 1968) and the Hostility and Direction of Hostility Questionnaire (Caine et al, 1967). These instruments are described in the section on method (pages 58 & 59)

## Factors Related to Experience at the University

### A. Residence

Hypotheses:

1. The type of accommodation is related to academic performance.
2. Changes of residence are related to academic performance.
3. Satisfaction with living arrangements is related to academic performance.
4. The nature of financial support is related to academic performance.
5. Satisfaction with financial support is related to academic performance.

### B. Social Activities and Relationships

Hypotheses:

1. High scorers on the 'Clubs and Societies' scale differ from low scorers in their academic performance.
2. High scorers on the 'Sports' scale will differ from low scorers in their academic performance.
3. The number of friends of the same sex is related to academic performance.
4. The number of friends of the opposite sex is related to academic performance.
5. Those with a special friend of the opposite sex and those without one differ in academic performance.

### C. Academic Relationships

Hypotheses:

1. Student's perception of the contact with teaching staff is related to academic performance.
2. Student's perception of the contact with the Director of Studies is related to academic performance.

D. Educational Factors

Hypotheses: 1. Satisfaction with University is related to academic performance.

2. Satisfaction with course of studies is related to academic performance.

E. Health and Illness

Hypotheses: 1. Physical illness:

(a) Reported physical illness is related to academic performance.

(b) Reported consultation for physical illness is related to academic performance.

2. Emotional disturbance:

(a) Reported emotional disturbance is related to academic performance.

(b) Reported consultation for emotional disturbance is related to academic performance.

# DESIGN AND METHOD

## Chapter 5

## THE GENERAL DESIGN OF THE STUDY

To fulfil the aims described in the previous chapter a prospective study was launched to examine the factors related to failure and drop-out in the First Year students who joined Edinburgh University in the academic year 1967-68.

The population:

It consisted of all the First Year students, defined for the purposes of the study, as those who (a) joined the University in the academic year 1967-68, (b) had never been to any University before and (c) were preparing for their first degree.

The definition, therefore, did not include the following:

1. Post graduate students.
2. Non graduating students, i.e. those who were not candidates for a degree at Edinburgh University but had enrolled for courses of study, for which credit might be given at some other (usually Foreign) University.
3. Diploma and certificate students.
4. Students who already had a first degree but had enrolled for a first degree in a new subject, (e.g. Science graduates joining medicine).
5. Transfers, from other courses in Edinburgh University or some other University.

The criterion:

It was the degree examination performance during the first year only. Results of both the June degree examination and the September resit examination were taken into consideration for categorising the students. The definition and categorisation of the criterion are discussed in detail in the chapter on Analysis.

Scope of the inquiry:

As will be apparent from the list of hypotheses given in the previous chapter, the study was intended to cover a wide field and took into consideration two types of factors: (1) those which characterised the students at the time of entry to the University and (2) those which were related to their experience while at the University.

Instruments:

The study was carried out with the help of two questionnaires, one given at the time of entry to the University and another given about six months afterwards. The questions were so designed that they could, either singly or in combination, provide direct or readily calculable information for classifying the cohort in terms of each of the items on which the various hypotheses were based.

Questionnaire I:

It is reproduced in Appendix C. This questionnaire was designed to cover the kind of factors related to the students' characteristics at the time of admission. It was precoded to ensure uniformity of responses and took about 15 minutes to complete. It was divided into

five sections:

Section I: dealt with personal and demographic data, i.e. name, age, sex, civil status, nationality, first language, religion and religious participation.

SectionII : had questions on the civil state of the parents, birth order, graduate status or otherwise of the parents and father's occupation. Students were asked if they had a step brother/sister or half brother/sister, so that those who answered in the affirmative could be excluded from analysis when testing the hypothesis regarding birth order. Father's occupation was used to determine the social class of the student, according to Registrar General's classification (1966). A decision was made to exclude all those students who lost their fathers before reaching the age of 14 years, when analysing the relation-:ship between social class and academic performance.

This section probed a little further into the family situation and relationships. Questions about home happiness, discussion of personal problems at home and the attitude of the parents towards the student coming to the University, were asked. The students were also asked about their own attitude towards coming to University.

SectionIII: dealt with the scholastic factors like type of school, type of certificate, boarder/day pupil status, who paid for the education at school and the grades achieved for the G.C.E. 'A' level or Scottish 'highers'.

The grades were used to construct for each student his School Achievement Score. The G.C.E. 'A' level grades, i.e. A,B,C,D and E

were assigned a score of 5, 4, 3, 2 and 1 respectively. The Scottish 'Highers' work on a different scheme and the range of grades is only from A to C. However, it is generally known that the standards expected for G.C.E. 'A' levels are higher than those for S.C.E. 'Highers'. An arbitrary decision was made to assign a score of 3, 2 and 1 for grade A, B and C respectively. This meant that a S.C.E. 'Higher' 'A' grade was equated with G.C.E. 'A' level, C grade and so on.

The scores for each subject offered by the students for 'A' level or 'Higher' certificate were added up and formed their respective School Achievement Score.

This section also had items on extracurricular activities at school and the interest the students took in such activities.

Section IV: besides checking on the faculty and the course the students were going to join, also had questions which were indirectly related to the students' motivation. They were asked if they had been able to gain entry into a course of their first choice and whether they had made any plans as to what occupation or profession they would take up after getting their degree.

Section V: was 'psychological'. It consisted of: (a) Personal Disturbance Scale and (b) Hostility and Direction of Hostility Questionnaire.

Personal Disturbance Scale (P.D. Scale), is a part of the Symptom Sign inventory (Foulds and Hope 1968) which is based on the theore-:tical formulation of Foulds (1965). Foulds makes a plea that

symptoms and signs should be measured independently of personality traits and attitudes. The two dimensions according to him are quite different; symptoms and signs being dystonic and distressing while traits and attitudes being egosyntonic. The former are transient while the latter are more enduring. Most of the personality tests (E.P.I. for example), include items of both kinds.

P.D. scale is supposed to test a person on Disturbed-Normal continuam and according to the authors, "may be of value as a screening device in epidemiological and social surveys".

In the present inquiry the scale was employed as a quick screening procedure for emotional disturbance.

Hostility and Direction of Hostility Questionnaire (Caine et al 1967).

This is an objective way of assessing the personality trait of hostility or aggression. It is based on the assumption (Foulds 1965), that hostility is an unitary entity and may be directed inwards or outwards. In the first case the person is called intrapunitive and in the latter case, extrapunitive. Phillip (1969) questioned the assumption about hostility being an unitary entity. In this investigation Foulds' assumption was followed.

The test has five sub-scales. Two of these, i.e. Self criticism (SC) and Delusional Guilt (DG) are measures of intra-:punitiveness while the other three, Acting out Hostility (AH), Criticism of Others (CO) and Delusional Hostility (DH) are measures of extrapunitiveness. The scores on the five sub-scales when added

up, provide the Total Hostility score. The Direction of Hostility is found by the formula (2 SC + G) - (AH+CO+DH). A minus score means externally directed hostility and a plus score means an internally directed hostility.

This test was used to probe the relation between 'aggression' and academic performance.

Questionnaire II:

It is reproduced in Appendix D. This was also precoded and had items related to the student's experience while at the University. It took only 5 minutes to complete. There were questions on residential and financial arrangements and the students' satis-:faction with those arrangements.

The interest taken in extracurricular activities was measured with the help of two simple scales: (a) students were asked to name the clubs and societies of which they were members. For each such entry on the list, students got a score of 3, if they held an official position in the club, a score of 2 if they attended more than 50% of the meetings and a score of 1 if they attended less than 50% of the meetings. The scores for different clubs added up, formed their respective Clubs and Societies Score. (b) Similar procedure was carried out to give students their Sports Score.

Social relationships were investigated by asking the students the number of close friends they had, of either sex, and if they had a special friend of the opposite sex.

Academic relations were measured by asking the students if they

had sufficient contact with teaching staff and the Directors of Study. It was fully realised that these questions were only a measure of the students' 'perception' and not an objective measure of the relationship.

Questions were asked about the satisfaction with the University and the course.

'Physical' and 'Emotional' health was investigated. It has been mentioned before ( page 37 ) that 'consultation' is not an adequate indicator as many students, in spite of being distressed, are not 'counted', because they do not go to the doctor. On the basis of the questions asked in this inquiry, the students could be divided into three categories: (a) those who report no illness, (b) those who claim to have been unwell but do not report consultation and (c) those who claim consultation. These questions were put in a form exactly similar to the one which Kidd (1963) had used in his investigation.

It may be pointed out that for both the questionnaires, complete confidentiality (not anonymity) was promised to the student.

## Chapter 6

## OPERATIONAL PROCEDURE

Pilot study: In August 1967, Questionnaire I was given to 20 first year nursing students to: (a) estimate the time taken to complete the questionnaire and to (b) see if there were any ambiguities in the phrasing of the questions.

On an average, the nursing students took about 15 minutes to complete. As a consequence of the comments made, the phrasing of some of the questions was modified.

The Main Investigation fell naturally into the following three stages:

Stage I: Completion of the first questionnaire:

The first questionnaire was completed by the students in the presence of the investigator (or one of his assistants) at the time of entry to the University. The site chosen for the procedure was the McEwan Hall, within the precincts of the University.

Every student in Edinburgh University is expected to get a chest X Ray before matriculation. The University Health Service makes arrangements to provide a temporary Mass Miniature Radiography (M.M.R.) unit in the McEwan Hall during the last week of September and the whole month of October. Most students take advantage of this facility, though a few get an exemption from the University

Secretary.

Kidd (1963) in an earlier survey with the first year students, got a response rate of almost 100% by giving the questionnaire to the students when they came for their X Ray. It was decided to follow his example and on request, the Senior Physician of the Edinburgh University Health Service kindly granted his permission to carry out the investigation in the McEwan Hall.

One end of the corridor where the students usually queue up for the X Ray was partitioned off to provide space and furniture for 25 students to sit down at one time and fill up the schedule.

To see that only those covered under the definition filled up the questionnaire; a 'triple check' system was adopted. (a) A placard outside the door requested the 'new students' to queue up separately, (b) a servitor at the door separated the new under-:graduate degree students from the new postgraduates etc., and (c) an assistant at a desk near the door, confirmed that the student was a 'First Year Student' as defined for the purposes of the study, before asking if he would help with "Edinburgh University Students' Inquiry". If the student agreed, (only 3 students, all males, refused - all on the grounds that they were not ready to give personal information) he was requested to go behind the screen where the investigator or one of the two trained assistants explained the general purpose of the inquiry and gave him a questionnaire to fill up. After the student had completed the questionnaire he was directed to take up his position in the queue

for the X Ray.

The process went on for five weeks, though most students came in during the first two weeks. The investigator himself and/or at least one of the assistants, were always present to help the student with any difficulty in understanding the questions.

After the five weeks were over, an alphabetical list of the students who had completed the schedule, was prepared and matched with the lists of 'First Year Students' provided by the various faculties. Two types of errors were discovered:

1. Some students not covered by the definition had filled up the questionnaire. These schedules were destroyed.
2. Some students who should have filled up the questionnaire had not done so, either because (a) they got an exemption from X Ray and did not come to the M.M.R. unit or (b) because they came but were missed (some of them might have deliberately abstained from joining the 'First Year Student' queue) or (c) because they joined the University after the temporary M.M.R. unit had closed down.

These students were contacted by post, their local addresses having been collected from the respective faculty offices. The questionnaire was sent to them along with a stamped addressed envelope. This was followed by two reminders and by the middle of December 1967, 99% of the cohort had responded. (Full details of the response rate are given in the section on Results).

The questionnaires were then processed. The scoring of the

P.D. scale and the H.D.H.Q. was completed by the end of January, 1968. Each student was given a serial number and the information collected about him was transferred to an eighty column punch card.

Adjustment of the cohort:

Before sending the second questionnaire, some cards were excluded because the students had not joined the University, in spite of filling up the questionnaire. One reason could be that they got admission at some other University of their preference. Some had been given direct admission to second year. Since their examination results could not be compared to those of others, these students were also excluded from the inquiry.

Stage II: Completion of the Second Questionnaire.

The second questionnaire was sent by post to all the students who were included in the adjusted cohort. The local addresses of the students were rechecked and the questionnaire was sent along with a stamped addressed envelope, in the middle of April 1968. Three quick reminders were sent to the non responders and by the end of May 1968 91% of the cohort had responded.

The questionnaires were processed and the information trans-:ferred to another eighty column punch card.

Stage III: Collection of Examination results.

The June examination results were collected in August 1968 and the results of the September resit examinations were collected in

October 1968. During this month the students in the cohort matriculated a second time and a list of matriculated students was acquired from the Matriculation office. By comparing this list, with that of the names in the cohort under study, the names of the students who did not matriculate a second time were collected. These were obviously the students who had left the University. The names so discovered were once again matched with those in the 'withdrawn students' list prepared by different faculties and a further list prepared of those students who left the University at any stage but before the September resit examination. These were to be the 'Voluntary Drop-outs' for the purpose of the inquiry, (see next chapter on Analysis).

The information about examination results, etc. was also transferred to punch cards. Each student in the cohort now had three cards and the data was ready for analysis.

## Chapter 7

## THE ANALYSIS

### Definition and Categorisation of the Criterion

Before any meaning could be extracted out of the data which had been collected it seemed necessary to define and categorise the 'criterion' against which the various independent variables were to be measured. The vagueness with which the words like Success, Failure and Drop-out have been used in some of the studies has been referred to in the preceding section on review of literature. It appeared that the conventional method by which the various faculties in Edinburgh University report the annual 'Failure' and 'Withdrawal' figures was not suitable for the purposes of this study. An examination of the 'flow chart' (Figure 2) will clarify this point.

A student admitted to the University can either leave the University (1) or stay on to appear in the June examinations. He may pass all the subjects in the June examinations (2) or 'fail' one or more subjects. The student who 'fails' may either leave the University (3) or stay on to appear in the September resit examination. At the resit examination he may pass all the subjects (4) or fail one or more subjects. The name of the student who has 'failed' according to the criteria of the faculty goes on to the 'Dean's list', after examining which the Dean decides whether to discontinue the student (5), allow the student to 'withdraw' (6) or to allow him to continue* (7) (Private Communication)** Of course, a student may at any stage ask to

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*That is to resit the failed subject next year, or repeat the whole year.

**Different faculties differ slightly in detail, but this is the general pattern.

be transferred to another faculty or another University. The figures which are given out by the faculty show: (a) Failures, which are actually only those students who are specifically asked to leave (5), and (b) Withdrawals, which combine the students who have withdrawn at stage (1) or (3) with the students who are asked to withdraw (6), after they have appeared on the 'Dean's list'. This is in fact a mixing up of essentially different categories. The Withdrawals (6) are closer to the Failures (5) as both categories have Failed one or more examinations at the September resit, than to the Withdrawals (1) and (3) as the latter have not 'persisted' long enough to take advantage of all the chances offered by the University. As the review of literature shows, there is reason to believe that those students who have not persisted long enough may differ qualitatively from those who fail the exams. The variables under consideration in this study, therefore, may be differently related to failing students and to those who leave before the September resit.

In this study, it was decided to separate the two categories. All students who left the University before sitting the September examination were called the Voluntary Drop-outs.

There was another problem about defining the Failures. Different departments differed in their definition. Most departments considered a student a 'Failure' if he failed one or more subjects. A few departments were, however, less strict and considered a student a Failure if he failed in two or more subjects. This raised methodological problems and for the purpose of this study any student from any faculty who failed one or more subjects by the September resit examination was defined as a Failure, irrespective of whether he was asked to leave, withdraw voluntarily or reappear next year.

All the students who were not 'Voluntary Drop-outs' or 'Failures' were considered Successful. There was one more issue to be taken into account. The literature shows that there are some variables which have a special relationship with academic performance (e.g. emotional disturbance: page 35 ) in that they are positively related to students at both extremes, i.e. Very Successful and the Failures or Drop-outs. If the 'Successful' student group is not 'teased out' to show the Very Successful and the less successful students, this special relationship cannot be brought out. It was, therefore, considered necessary to carve out a group of students who could be called 'Very Successful' students.

A simple method of defining the category of 'Very Successful' students is to rank the students according to their marks and select the top 25%. This method may, however, lead to a certain degree of 'false' ranking. A student who takes a subject for which the marking is traditionally 'lenient' will have a greater chance of getting a higher rank when compared to a student who takes a subject with strict marking. The problem is, however, not insurmountable and in this study it was dealt with by standardising the marks.*

Standardisation of Marks

The 'mean' and 'standard deviation' can be found for the marks given in each subject. The 'strict' subject will have a lower mean than the 'lenient' subject. The standard deviation will differ according to the degree of spread around the mean for the two subjects. One way of making

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* Poor inter-examiner and test-retest reliability of examinations procedure will also contribute to false ranking, but, to overcome this problem, a complete overhauling of the assessment techniques is necessary.

the marking comparable is by bringing all subjects to a common mean and standard deviation and re-allocating the marks to students on this basis. This technique is only employed to reduce the disparity for the special needs of this study and is not in any way a comment on the policies of the departments.

All the subjects were brought to a common mean of 50 and standard deviation of 10. The students were re-allocated a 'new mark' with the help of the following formula.

$$Sn_i = \left( \frac{Sa_i - M_i}{\sigma_i} \right) \times 10 + 50$$

Where: $Sa_i$ is the actual mark obtained by a student

S is subject $_i$

$M_i$ is the mean for subject$_i$

$\sigma_i$ is the standard deviation for subject$_i$

$Sn_i$ is the 'new mark' for the subject$_i$

Most students were expected to offer three subjects for the First Year examination. Some students offered four (Law Faculty) and some, for one reason or another, were allowed to offer only two.

The 'new marks' for different subjects were added up for each student and an 'average mark' obtained by dividing the sum by the number of subjects he was expected to offer. When the student was expected to appear for three but appeared for only two, he was allocated a zero mark for the third subject.

The students were ranked according to their 'average mark' separately for each faculty and the top 25% in each faculty were selected to form the category of <u>Very Successful students.</u> All Successful students who did not

fall into the category of Very Successful students were called Moderately Successful.

To summarise, students were divided into four groups:-

1. Very Successful: Those who after standardising the June examination marks formed the top 25% in each faculty.
2. Moderately Successful: Those who passed all the subjects expected from them but did not fall into the Very Successful category.
3. Failures: Those who failed one or more subjects at the September resit examination.
4. Voluntary Drop-outs:* Those who left the University at any stage but before appearing for the September resit.

In Figure 2 Very Successful students are shown as category (8). Moderately Successful include categories (2) and (4). Failures include the categories (5), (6) and (7). Voluntary Drop-outs include category (1) and category (3).

Description of the Cohort

Before proceeding to test the hypotheses, a description of the cohort was carried out in terms of some of the items in the first and the second questionnaire. Wherever appropriate, interfaculty comparisons were undertaken. The number of students in courses like Music, Dentistry and

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* In the subsequent description the term 'Drop-out' is used sometimes without the adjective 'Voluntary'. Both terms, i.e. 'Voluntary Drop-outs' and 'Drop-outs', however, refer to the same category of students.

Veterinary was not large enough for such purposes. The Music Faculty was, therefore, combined with the Arts and jointly referred to as Arts. The Dentistry, Veterinary and Pure Medicine students were combined and jointly referred to as Medicine. Other faculties were left as such.

The students could, therefore, be divided into the following five groups:-

1. Arts
2. Science
3. Social Science
4. Law
5. Medicine

Statistical tests were used to confirm if the observed male:female and interfaculty differences were significant. Most often a chi square test was used. Where the data could be assumed to be quantitative, parametric tests like the student's 't' test and one way analysis of variance were used.

Testing of the Hypotheses

The hypotheses were tested separately for males and females, but all the faculties were pooled together.

(a) Each variable was considered separately and examined in relation to the four categories of academic performance, that is: Very Successful, Moderately Successful, Failures and Drop-outs.

(b) Where the data was qualitative and the hypothesis non-directional, a chi square test was carried out after drawing a 4 X N contingency table (4 categories of the academic performance and 'N' categories of the operative factor). The hypothesis was considered supported when the change of the null hypothesis being correct was less than 5%.

(c) When the hypothesis was of a directional nature, the data was compressed into a 2 x 2 table before carrying out a chi square test (all *Successful students being compared with all **Unsuccessful students). This was done because directional interpretation of the results becomes much easier if only two proportions are being compared at a time.

(d) Occasionally an examination of the data revealed that more interesting information could have been obtained had the formal hypothesis been worded, and therefore tested, in a different fashion. Since it is not a good statistical practice to rearrange the data purely in the hope of achieving a significant chi square value the technique of partitioning the degrees of freedom was employed. This permitted the sub-division of the overall chi square value into its additive components. Irwin (1949) and Lancaster (1949) have shown that overall chi square for a contingency table can be partitioned into as many components as there are degrees of freedom. The technique employed in the present study is that developed by Brandt and Snedecor and is described by Maxwell (1967). This technique not only shows an overall significant difference between N categories but also indicates the statistical significance of the difference between two groups at a time.

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* Successful students = Very Successful and Moderately Successful.
** Unsuccessful students = Failures and Drop-outs.

(e) Sometimes the a priori hypothesis itself demanded more than one comparison (e.g. British students are better than Foreign students and 'Other British' students are better than the Scottish students). When this was so the technique of partitioning the chi square was employed directly, being the most suitable for the testing of such a hypothesis.

(f) When the data was quantitative, parametric tests were used because they were more powerful. A student's 't' test or one way analysis of variance was used in the present study. Wherever appropriate further tests were carried out after one way analysis of variance to compare two groups at a time. Scheffes' test was used for this purpose. The principle underlying the test is discussed in Appendix B.

Prediction

Each variable which had a statistically significant relation with the future academic performance could strictly be called a predictor. But as is evident from the review of literature, none of the factors could be expected to have more than a low correlation with the outcome. A prediction scale which made a joint use of the different variables might, however, increase the total predictive power.

A number of techniques are available for constructing such a scale. Manheim and Wilkins (1955) claim that an ideal prediction scale should have the following properties:-

1. Simplicity: The prediction tables should be easily applicable to every case.
2. Efficiency: All the available information should be utilized to the maximum. In particular, when it is clear that some factors are more important than others in discriminating between Success and Failure, then they should be given an appropriate weight in the scoring system. Moreover when the factors are correlated with each other the effect of each factor should be partialled out.
3. Repeatability: The scales should be able to be used by a wide variety of people and not be dependent on subjective judgments.
4. Validity: The scales should predict the probability of a certain kind of behaviour for a group of individuals, and the confidence with which such behaviour is predicted should not vary from group to group.

There is no perfect technique which fulfils all the criteria. The simplest method probably would be to add or subtract one point of score respectively for any item of information found to be positively or negatively correlated with the outcome.

Such a method would be 'inefficient' in the sense of Manheim and Wilkins, as each item gets an equal weight and the effect of different factors are not partialled out.

Other methods are available by which a differential weighting of the independent variables can be achieved. The computational procedures employed for these methods are, however, very complicated. If one is out to look for a scale which can be of practical use in predicting the academic performance of 2,000 new students every year, these may prove too cumbersome.

In the present study instead of showing preference for one method over the other, two different prediction scales were constructed. One of the scales was based on multiple regression, a technique with which it is possible to assign a certain weight to each variable, depending on the degree of association it has with the outcome. The principle underlying the technique is discussed in Appendix B.

The other scale was based on a self devised procedure which was much simpler. The steps in the procedure were as follows:-

1. The factors which had a significant association with successful outcome were isolated. This was done by examining the 4 x N contingency tables.
2. For each factor with a dichotomous classification, a score of '0' was assigned to the class which showed poor outcome, and a score of '2' to the class with good outcome. If the variable was continuous, e.g. "School achievement score" an arbitrary cut-off point divided the low scorers from the high scorers, thus making the classification dichotomous once again. When the students were classified into three categories as for Nationality, the score of '2' was given to the class which had the best outcome, '1' to the class with the next best outcome and '0' to the class with the poorest outcome.
3. A total score was computed for each student and the predictive power of the scale was tested by comparing the actual performance of each student with his 'score'.

It is evident that though each factor had a value ranging from '0' to '2' the factors were not weighted in relation to each other.

The argument behind the dual approach was that, if the simple prediction scale did not fall <u>too short</u> of multiple regression scale in its predictive power, it could be recommended for practical use. The more sophisticated multiple regression scale was to be a yardstick on which to measure the efficiency of the simple scale.

Validation of Prediction Scales

The validity of a prediction scale can be confirmed by trying it on a new population. In the particular instance of the present study it would have meant waiting for the next year's cohort. One possible method of quick validation could have been to break the total cohort into two groups randomly and treat the two groups as two different populations. The scale could then be constructed by using one group and checked for its validity by testing it on the other. The size of the total cohort was such that the procedure could be carried out without making the sub-samples too small for a meaningful analysis.

Only the multiple regression scale was validated in this fashion. A four-fifths (4/5th) sample was drawn in a random fashion from the male and female cohorts respectively. Multiple regression was carried out with this group and the predictive power of the scale so derived was estimated by comparing the 'score' of the students with their actual performance. The validation procedure was carried out by using the scale with those one fifth of males and females respectively who had taken no part in multiple regression.

As the simple prediction scale was based on the associations observed in the 4 x N contingency tables for which the total population had been used, it could not be validated in the above mentioned manner.

# RESULTS

Chapter 8

## THE COHORT

### Potential Cohort

Out of the total intake for the academic year 1967-68, 1,987 students fulfilled the criteria necessary for inclusion in the category of "First Year Students", as defined for the purposes of the inquiry (page 55 ). However, all the five students from the Faculty of Divinity who fulfilled the criteria were excluded as the number was too small for any meaningful analysis. The total number of students expected to take part in the inquiry was therefore 1,982.

### Response to 1st Questionnaire

By the end of October 1967 when the University Health Service closed down the temporary registration office and the M.M.R. Unit in the McEwan Hall, 1,860 students had completed the schedules.

Three students (all men) refused to take part in the inquiry, each one on the grounds that the information asked for was of too personal a nature. The others who were missed at this stage for one reason or another (page 64 ) were contacted by post. After two reminders and by the middle of December 1967 a total of 1,967 First Year Students had completed the schedules. Four of these schedules were rejected because they had been returned incomplete and had not been completed by the respective students, even on repeated request. Therefore 1,963 out of 1,982 students expected to take part in the inquiry answered the questionnaire in full.

The response rate to the first questionnaire can therefore be calculated as:- $\frac{1,963}{1,982} \times 100 = 99\%$

Potential Candidates for the 2nd Questionnaire

Out of 1,963, twelve students were excluded from the inquiry as they were found later not to have joined the University in spite of being on the faculty lists and having filled in the questionnaire.

At this stage it was also realised that a small proportion of students, though coming under the definition of First Year Students, could serve no useful purpose by taking part in the inquiry, since they had received direct admission to second year and their future examination results could not be compared with those of the others. Ninety-one students in all were excluded on this basis.

This left a total of 1,860 students whose schedules were used for all subsequent analysis, and it was to these 1,860 students that the second questionnaire was sent.

Response to 2nd Questionnaire

This questionnaire was sent by post in April 1968. By the middle of May 1968 and after three reminders 1,705 students returned the completed questionnaire - a response rate of 91%.*

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* Twenty-two students are definitely known to have left the University before the second questionnaire was sent. These obviously could not have completed the questionnaire. If the calculations are carried out after excluding these twenty-two from the denominator, the response rate becomes 93%.

A description of the cohort:

A preliminary analysis was carried out to describe the cohort in terms of certain items included in the first and second questionnaires, so as to get a general understanding of the social, psychological and academic characteristics of the students taking part in the inquiry. Wherever appropriate, certain inter-faculty comparisons were also made. For the reasons mentioned before, students from the Faculty of Music were considered along with those from the Faculty of Arts, hereafter jointly referred to as "Arts", and the students from the Faculty of Veterinary Medicine were considered along with those studying pure medicine and dentistry, hereafter jointly referred to as "Medicine".

1st Questionnaire

Table 1 shows the distribution of the cohort by sex and faculty.

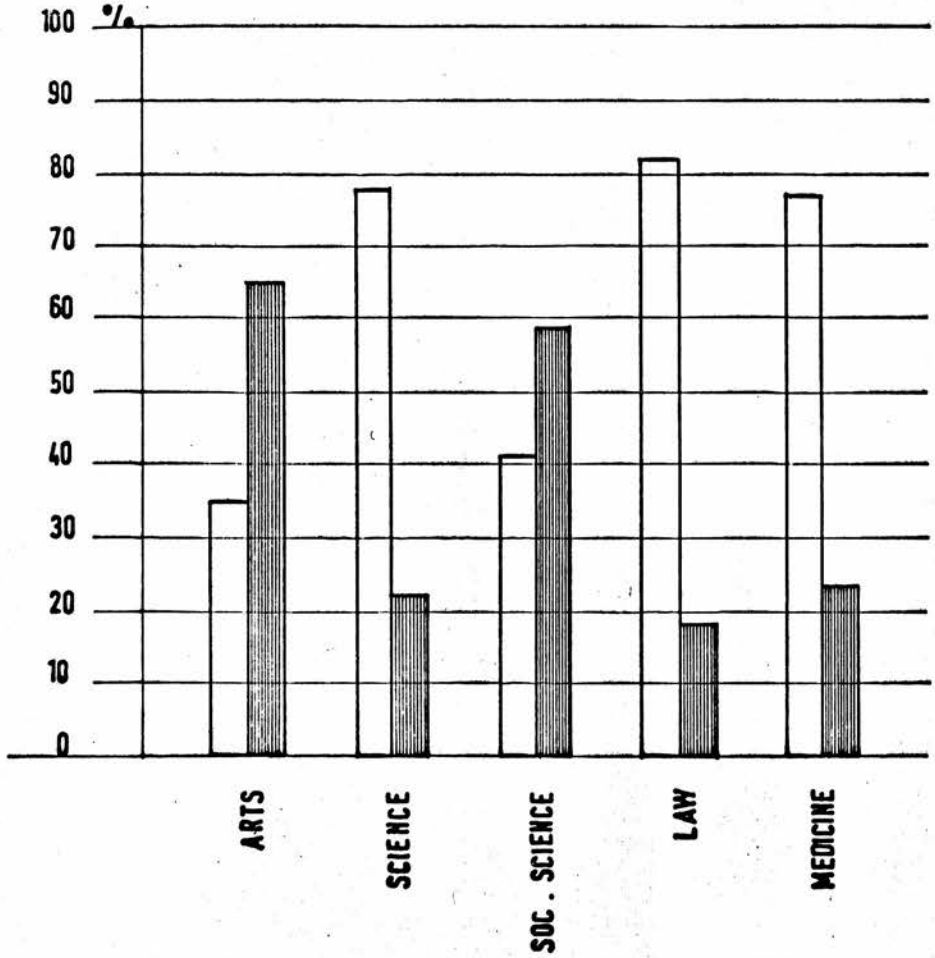
TABLE 1

| FACULTY | Arts | Science | Social Science | Law | Medicine | TOTAL |
|---|---|---|---|---|---|---|
| Males | 235 | 453 | 127 | 92 | 148 | 1055* |
| Females | 435 | 125 | 182 | 20 | 43 | 805* |
| TOTAL | 670 | 578 | 309 | 112 | 191 | 1860 |

$\chi^2=332.03$, d.f.=4, $p<.001$

* In the subsequent analysis, wherever the total number of males and females adds up to less than 1,055 and 805 respectively and no explanation is offered for the discrepancy, it should be assumed that a few students failed to answer that particular question.

FIGURE 3




SEX DISTRIBUTION IN VARIOUS FACULTIES

There are 1,055 males and 805 females. The differences in the male:female ratio in the various faculties are very significant. The Faculties of Science, Law and Medicine have more men than women while the reverse is true in the case of the Faculties of Arts and Social Science.

The histogram (Figure 3 ) illustrates the differences in the male:female ratio in the various faculties.

Age Distribution

Table 2 shows the age distribution in males and females.

* TABLE 2

| Age Groups | Males (1,055) | Females (805) |
|---|---|---|
| 17 years | 14% | 19% |
| 18 years | 61% | 66% |
| 19 years | 15% | 9% |
| 20+ years | 10% | 6% |

$\chi^2=31.96$, d.f.=3, $p<.001$

The females are in general younger than the males, the difference being very significant at the .001 level.

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* The various tables show only the percentages (rounded to the nearest whole number). Below each table is shown the result of the statistical test whenever it was carried out.

Nationality

Table 3 shows the proportion of Scottish, Other British (English, Welsh and Irish) and Foreign students for males and females respectively.

TABLE 3

| Nationality | Males (1,055) | Females (805) |
|---|---|---|
| Scottish | 71% | 71% |
| Other British | 25% | 25% |
| Foreign | 4% | 4% |

$\chi^2 = .134$, d.f.=3, n.s.

The distribution is exactly the same for males and females. Interesting differences, however, appear if the distribution is broken down by the faculty.

Table 4 and Table 5 show the inter-faculty differences. The chi square test compares Scottish students vs. the rest. The 'Other British' and the Foreign students are combined into one category so as to get a sufficient number in each cell.

TABLE 4

NATIONALITY IN DIFFERENT FACULTIES (Males)

| Nationality | Arts (233) | Science (453) | Social Science (127) | Law (92) | Medicine (148) |
|---|---|---|---|---|---|
| Scottish | 77% | 68% | 75% | 95% | 54% |
| Other British | 19% | 27% | 20% | 5% | 41% |
| Foreign | 4% | 5% | 5% | 0% | 5% |

$\chi^2 = 51.17$, d.f.=4, $p < .001$

TABLE 5

NATIONALITY IN DIFFERENT FACULTIES (Females)

| Nationality | Arts (433) | Science (125) | Social Science (182) | Law (20) | Medicine (43) |
|---|---|---|---|---|---|
| Scottish | 73% | 61% | 74% | 85% | 58% |
| Other British | 22% | 36% | 24% | 15% | 35% |
| Foreign | 5% | 3% | 2% | 0% | 7% |

$\chi^2 = 11.15$, d.f.=4, $p < .025$

The differences are significant both in males and females. Examination of the percentages shows that the Medical Faculty has the highest proportion of 'Other British' males. The proportion of 'Other British' females is equally high in both the Science and the Medical Faculties. The Law Faculty has the highest proportion of Scottish students, both males and females. The proportion of Foreign students is generally low and there are no Foreign students in the Law Faculty.

Social Class

The occupation of the father was used to categorise the students. Although the Registrar General now recommends the use of seventeen socio-economic categories ( 1966 ), the older system of classification by five social classes was adopted in this inquiry so as to make it comparable with previous studies.

Foreign students (43 males and 32 females) were not considered. The students who had lost their father before they were fourteen years old were also excluded (55 males and 35 females) because it would have been difficult to follow and assess the change in their social circumstances after their father's death.

The male/female differences are shown in Table 6.

TABLE 6

| | Males (957) | Females (738) |
|---|---|---|
| Social Class I | 22% | 29% |
| Social Class II | 45% | 38% |
| Social Class III | 25% | 25% |
| Social Class IV & V | 8% | 8% |

$\chi^2=12.55$, d.f.=3, $p<.01$

The social class distribution is significantly different in males and females. The difference is apparently in the distribution of upper social classes (I and II), 29% of females being from social class I while only 22% of the males belong to this class. The lower social classes (III, IV and V) show exactly similar distribution.

Table 7 and Table 8 show the inter-faculty differences in the social class distribution. The data has been compressed to compare the distribution of higher social classes (I and II) vs. the lower social classes (III, IV and V).

TABLE 7

SOCIAL CLASS DISTRIBUTION IN DIFFERENT FACULTIES (Males)

| | Arts (206) | Science (412) | Social Science (112) | Law (88) | Medicine (139) |
|---|---|---|---|---|---|
| Higher Classes (I and II) | 54% | 69% | 65% | 79% | 72% |
| Lower Classes (III, IV & V) | 46% | 31% | 35% | 21% | 28% |

$\chi^2 = 22.52$, d.f.=4, $p < .001$

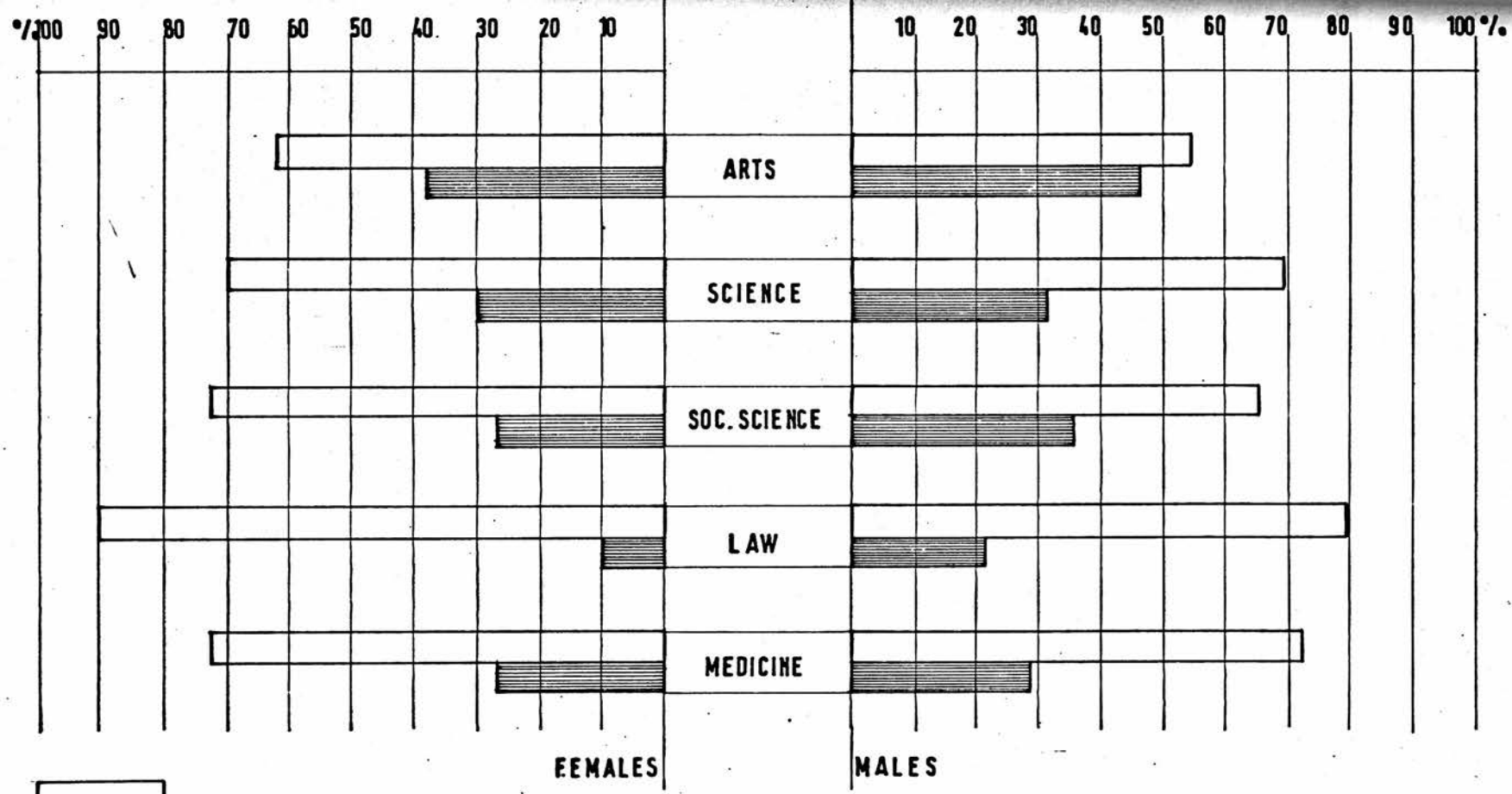
TABLE 8

SOCIAL CLASS DISTRIBUTION IN DIFFERENT FACULTIES (Females)

| | Arts (397) | Science (115) | Social Science (166) | Law (19) | Medicine (41) |
|---|---|---|---|---|---|
| Higher Classes (I and II) | 62% | 70% | 73% | 90% | 73% |
| Lower Classes (III, IV & V) | 38% | 30% | 27% | 10% | 27% |

$\chi^2 = 11.99$, d.f.=4, $p < .025$

The social class distribution shows statistically significant inter-faculty differences, both in males and females. The Law Faculty has the




INTERFACULTY DIFFERENCES IN SOCIAL CLASS DISTRIBUTION

highest proportion of upper class students, both males and females. The Arts Faculty has the highest proportion of lower social class students, both males and females. The accompanying histogram (Figure 4 ) illustrates the difference.

Educational achievements of the parents

Students were asked if their parents were University graduates (father, mother or both). Table 9 shows the results.

TABLE 9

| | Males (1050) | Females (801) |
|---|---|---|
| Father graduate | 18% | 20% |
| Mother graduate | 3% | 4% |
| Both parents graduates | 6% | 9% |
| None graduate | 73% | 67% |

$\chi^2=12.14$, d.f.=3, $p<.01$

The differences are statistically significant. Thirty-three per cent of the females have at least one parent who is a University graduate as against 27% of the males.

Table 10 and Table 11 show the inter-faculty differences for males and females respectively.

TABLE 10

EDUCATIONAL ACHIEVEMENTS OF PARENTS (Males)

| | Arts (233) | Science (450) | Social Science (127) | Law (87) | Medicine (48) |
|---|---|---|---|---|---|
| At least one parent graduate | 23% | 22% | 24% | 42% | 42% |
| Neither parent graduate | 77% | 78% | 76% | 58% | 58% |

$X^2=35.47$, d.f.=4, $p<.001$

TABLE 11

EDUCATIONAL ACHIEVEMENTS OF PARENTS (Females)

| | Arts (433) | Science (124) | Social Science (181) | Law (20) | Medicine (43) |
|---|---|---|---|---|---|
| At least one parent graduate | 31% | 29% | 32% | 70% | 52% |
| Neither parent graduate | 69% | 71% | 68% | 30% | 48% |

$X^2=19.77$, d.f.=4, $p<.001$

The inter-faculty differences are statistically significant. Both Law and Medical Faculties stand out quite separate from the rest, in respect of having more students with graduate parents.

Academic Achievement at School

As mentioned before, an arbitrary system was devised for scoring the grades achieved by students in their 'A Level' or 'Higher' examinations (page 57 ). The scores for all the subjects passed by the student were then added up and the composite score was called the "School Achievement Score" (S.A.S.).

A student's 't' test was carried out to compare males and females. Table 12 shows the results.

TABLE 12

| | S.A.S. Mean | Standard Deviation |
|---|---|---|
| Males | 10.06 | 4.34 |
| Females | 10.62 | 3.78 |

't' value=2.93, d.f.=1799, $p<.01$

The females have higher mean S.A.S. than males, the difference being statistically significant.

Tables 13 and 14 give the inter-faculty differences in the "School Achievement Score".

TABLE 13

SCHOOL ACHIEVEMENT SCORE IN DIFFERENT FACULTIES (Males)

| | Arts | Science | Social Science | Law | Medicine |
|---|---|---|---|---|---|
| S.A.S. Mean | 10.10 | 9.65 | 9.81 | 8.95 | 11.02 |
| S.D. | 3.71 | 5.74 | 3.99 | 3.05 | 4.10 |

| | Sum of Squares | D.F. | Mean Square |
|---|---|---|---|
| Between samples | 265.118 | 4 | 66.4 |
| Within samples | 18674.826 | 1005 | 18.58 |

F ratio = 3.57, $p<.01$

The inter-faculty differences are significant at .01 level with Medical students having the highest mean S.A.S. and Law students the lowest.

TABLE 14

SCHOOL ACHIEVEMENT SCORE IN DIFFERENT FACULTIES (Females)

| | Arts | Science | Social Science | Law | Medicine |
|---|---|---|---|---|---|
| S.A.S. Mean | 11.00 | 10.24 | 9.37 | 11.37 | 12.88 |
| S.D. | 3.62 | 3.45 | 3.39 | 5.48 | 4.83 |

| | Sum of Squares | D.F. | Mean Square |
|---|---|---|---|
| Between samples | 585.746 | 4 | 146.436 |
| Within samples | 10664.231 | 785 | 13.585 |

F ratio = 10.773, $p<.001$

The inter-faculty differences are very significant in the case of females with Medical students having the highest mean S.A.S. and the Social Science students the lowest.

Type of Certificate

Table 15 shows the differences between males and females with respect to the type of certificate they come with. Those having the Scottish certificate (S.C.E.) alone were considered separately. Those having the G.C.E. were taken as one group, irrespective of whether or not they had a Scottish certificate. The third category was of the students who came to University after having passed an examination other than the S.C.E. or G.C.E.

*TABLE 15

| | Males (1055) | Females (804) |
|---|---|---|
| S.C.E. alone | 59% | 61% |
| G.C.E. | 38% | 39% |
| Other certificate | 3% | 0% |

$\chi^2=10.83$, d.f.=2, $p<.005$

* There were only 4 female foreign students. The real percentage figure is .49% but following the rule of rounding it off to the nearest whole number it is shown as 0%.

Nearly three out of five students come to University with the Scottish certificate alone. The main contribution to the chi square value is obviously from the different proportions of male and female foreign students.

The inter-faculty differences are shown in Tables 16 and 17 The chi square test compares students with the Scottish certificate vs. the rest.

TABLE 16

TYPE OF CERTIFICATE IN DIFFERENT FACULTIES (Males)

| | Arts (235) | Science (453) | Social Science (127) | Law (92) | Medicine (148) |
|---|---|---|---|---|---|
| S.C.E. | 58% | 60% | 71% | 58% | 52% |
| G.C.E. | 38% | 38% | 28% | 40% | 45% |
| Other | 4% | 2% | 1% | 2% | 3% |

$X^2=11.33$, d.f.=4, $p<.025$

TABLE 17

TYPE OF CERTIFICATE IN DIFFERENT FACULTIES (Females)

| | Arts (434) | Science (125) | Social Science (182) | Law (20) | Medicine (43) |
|---|---|---|---|---|---|
| S.C.E. | 59% | 52% | 70% | 60% | 63% |
| G.C.E. | 40% | 47% | 30% | 40% | 37% |
| Other | 1% | 1% | 0% | 0% | 0% |

$X^2=10.85$, d.f.=4, $p<.05$

The differences are significant both in males and females. Examination of the percentages shows that the Social Science Faculty is the one with the highest proportion of S.C.E. (only) students, both males and females. The Medical Faculty has the highest proportion of males with G.C.E. while the Science Faculty has the highest proportion of females with G.C.E.

Type of School

Table 18 shows the proportion of students coming from private or independent schools (English and Scottish combined). Foreign schools are excluded in this analysis.

TABLE 18

| Schools | Males (1004) | Females (778) |
|---|---|---|
| Private or Independent | 30% | 28% |
| Rest | 70% | 72% |

$\chi^2$=.45, d.f.=1, n.s.

The difference between males and females is not significant. More than a quarter of students come from private or independent schools.

Tables 19 and 20 show the inter-faculty differences.

TABLE 19

TYPE OF SCHOOL IN DIFFERENT FACULTIES (Males)

| | Arts (228) | Science (431) | Social Science (122) | Law (92) | Medicine (140) |
|---|---|---|---|---|---|
| Private or Independent | 24% | 30% | 29% | 54% | 24% |
| Rest | 76% | 70% | 71% | 46% | 76% |

$\chi^2=33.30$, d.f.=4, $p<.001$

TABLE 20

TYPE OF SCHOOL IN DIFFERENT FACULTIES (Females)

| | Arts (419) | Science (121) | Social Science (180) | Law (20) | Medicine (42) |
|---|---|---|---|---|---|
| Private or Independent | 27% | 26% | 29% | 50% | 31% |
| Rest | 73% | 74% | 71% | 50% | 69% |

$\chi^2=5.27$, d.f.=4, n.s.

The differences are very significant in the case of males but do not reach significance in the case of females. Examination of the percentages shows that the Law Faculty stands out as the one with the highest proportion of students from private or independent schools (54% for males and 50% for females).

Personal Disturbance Score

As mentioned before, the Personal Disturbance Scale of the Symptom Sign Inventory (Foulds and Hope, 1968 ) was used to assess the psychiatric state of the students at the time of admission. Three categories of scores were used. Those getting a score of 0-1 were labelled as "not disturbed", those getting 2-4 as "moderately disturbed" and those getting 5 or above as "disturbed".

Table 21 shows the distribution in these categories.

TABLE 21

| | | Males (1055) | Females (805) |
|---|---|---|---|
| Not disturbed | (0-1) | 70% | 69% |
| Moderately disturbed | (2-4) | 23% | 25% |
| Disturbed | (5+) | 7% | 6% |

$X^2=2.65$, d.f.=2, n.s.

The differences between males and females are not significant statistically.

Tables 22 and 23 show the inter-faculty differences. Though the percentages are shown in all the three categories of disturbance, the categories of 'moderately disturbed' and 'disturbed' were combined when carrying out the chi square test so as to have a sufficient number in each cell.

TABLE 22

P.D. SCORE IN DIFFERENT FACULTIES (Males)

| | Arts (235) | Science (453) | Social Science (127) | Law (92) | Medicine (148) |
|---|---|---|---|---|---|
| Not disturbed (0-1) | 66% | 72% | 66% | 70% | 75% |
| Moderately disturbed (2-4) | 24% | 22% | 24% | 25% | 20% |
| Disturbed (5+) | 10% | 6% | 10% | 5% | 5% |

$\chi^2=5.94$, d.f.=4, n.s.

TABLE 23

P.D. SCORE IN DIFFERENT FACULTIES (Females)

| | Arts (434) | Science (125) | Social Science (182) | Law (20) | Medicine (43) |
|---|---|---|---|---|---|
| Not disturbed (0-1) | 63% | 80% | 75% | 50% | 74% |
| Moderately disturbed (2-4) | 30% | 18% | 21% | 35% | 24% |
| Disturbed (5+) | 7% | 2% | 4% | 15% | 2% |

$\chi^2=21.61$, d.f.=4, $p<.001$

The differences are statistically significant in the case of females while they are not significant in the case of males. Fifty per cent of the Law Faculty females were disturbed to some degree while only 20% of the Science Faculty females were in this category.

Hostility and Direction of Hostility

The Hostility and Direction of Hostility Questionnaire (Caine et al, 1967) was given to the students for the reasons mentioned before (page 29) Table 24 shows the results.

TABLE 24

| | | Males | Females | 't' value | d.f. | p |
|---|---|---|---|---|---|---|
| Total Hostility Score | Mean | 17.04 | 17.61 | 2.105 | 1858 | <.05 |
| | S.D. | 5.84 | 5.59 | | | |
| Self-Criticism Score | Mean | 4.55 | 5.64 | 10.287 | 1858 | <.001 |
| | S.D. | 2.23 | 2.31 | | | |
| Delusional Guilt Score | Mean | 1.74 | 2.13 | 6.456 | 1858 | <.001 |
| | S.D. | 1.37 | 1.24 | | | |
| Criticism of Others Score | Mean | 5.05 | 4.44 | 5.8 | 1858 | <.001 |
| | S.D. | 2.3 | 2.18 | | | |
| Acting out Hostility Score | Mean | 4.68 | 4.39 | 2.88 | 1858 | <.01 |
| | S.D. | 2.21 | 2.06 | | | |
| Paranoid Hostility Score | Mean | 1.01 | 0.95 | 1.51 | 1858 | n.s. |
| | S.D. | 1.05 | 0.90 | | | |

The women have higher total hostility than the men. Women are very significantly higher than men on the Self-Criticism score and Delusional Guilt score, while men are significantly higher than women on Acting out Hostility and Criticism of Others. No statistically significant differences were observed on the Paranoid Hostility score.

Direction of Hostility

The mean direction of hostility for the males is -.46 while that for the females is +3.59. The difference between males and females was very significant at .001 level. Females are more intrapunitive than males.

SUMMARY OF INFORMATION ABOUT STUDENTS FROM THE FIRST QUESTIONNAIRE

1. There are more males than females in the Faculties of Science, Medicine and Law. The reverse is true for the Faculties of Arts and Social Science.
2. The women are younger than the men.
3. There are more non-Scottish students in the Medical Faculty than in any other Faculty, both in the case of males as well as females.
4. More women than men come from Social Class I. There are substantial inter-faculty differences. There is a very high representation from the higher social classes (Class I and II) in the Law Faculty (both for males and females). The Arts Faculty has the highest proportion of students from the lower social classes (III, IV and V) both for males and females.
5. More women than men have at least one parent who is a University graduate. The Law Faculty and the Medical Faculty have the highest proportion of students with graduate parents (both in males and females).
6. Females have a higher mean School Achievement Score than males. Inter-faculty differences are significant both in males and females. Medical students have the highest mean S.A.S. in both males and females. The Law Faculty has the lowest mean S.A.S. in males and the Social Science Faculty has the lowest mean S.A.S. in the case of females.

7. Three-fifths of the students come with the Scottish certificate alone. The Social Science Faculty has the highest proportion of S.C.E. students. The Medical Faculty, in the case of males, and the Science Faculty, in the case of females, has the highest proportion of students with G.C.E.

8. More than a quarter of students come from private or independent schools with the Law Faculty having more than half its students from private or independent schools.

9. Males and females do not differ as regards distribution on the Personal Disturbance Scale. There are no statistically significant inter-faculty differences in the case of males. The differences in the case of females are statistically significant, with the Arts and Law Faculties having the highest proportion of students with high P.D. scores.

10. Women have higher Total Hostility than males. Women are higher on Self-Criticism and Delusional Guilt. Men are higher on Acting out Hostility and Criticism of Others. There are no significant differences on the Paranoid Hostility subscale. Females are more intrapunitive than males.

2nd Questionnaire

A preliminary analysis was also carried out using some of the items in the second questionnaire. This was done to get an insight into the 'University Life' and to examine the nature of the stresses and problems, pressing on students.

1. Residence

(a) Table 25 shows the distribution of students with reference to the type of accommodation they had at the time they completed the second questionnaire. Three categories are shown: 'Hostels' refer to Halls of Residence and the Student Houses; 'Lodgings' refer to flats or digs or other similar accommodation and 'Home' refers to living with parents or relatives.

TABLE 25

| | Males (955) | Females (750) |
|---|---|---|
| Hostels | 30% | 40% |
| Lodgings | 37% | 30% |
| Home | 33% | 30% |

$\chi^2=18.61$, d.f.=2, $p<.001$

The differences between males and females are statistically significant. A higher proportion of females lived in Hostels at the time the second questionnaire was sent.

(b) Seventeen per cent of men and 16% of women had already changed their accommodation once or more during the first six months at the University.

(c) Twenty-eight per cent of men and 25% of women expressed dissatisfaction with the accommodation they had at the time of completing the questionnaire.

Financial Assistance

(a) Table 26 shows the distribution with reference to the nature of the financial assistance the students were getting.

TABLE 26

| | Males (955) | Females (750) |
|---|---|---|
| Grants or Bursaries only | 50% | 41% |
| Parent's support only | 5% | 6% |
| Grant and Parent's support | 45% | 53% |

$\chi^2 = 11.32$, d.f.=3, $p < .025$

The differences between males and females are statistically significant, more females than males being supported by their parents.

(b) Twenty-three per cent of men and 15% of women expressed dissatisfaction with the financial conditions and thought that these were a source of stress to themselves, their parents or both.

## Social Relationships and Activities

### (a) Friends

Eight per cent of men and 4% of women claimed to have no friends of the same sex at the University. The differences between males and females are statistically significant.

$$\chi^2=10.28, \quad d.f.=1, \quad p<.001$$

Forty-seven per cent of the men and 53% of the females claimed to have a special friend of the opposite sex. The differences are statistically significant.

$$\chi^2=15.4, \quad d.f.=1, \quad p<.001$$

### (b) Interest in Clubs and Societies

As described in the section on Method (page 60 ) a simple scale was devised to measure the interest the students took in clubs and societies at the University.

As the distribution of scores was very skewed, parametric statistical techniques could not be applied to compare the men and women. An arbitrary scheme of categorising was followed.

Score of 0-1 = Low interest
Score of 2-4 = Moderate interest
Score of 5+ = High interest

The distribution was as follows:- (Table 27)

| | Males (955) | Females (750) |
|---|---|---|
| Low interest | 44% | 35% |
| Moderate interest | 41% | 44% |
| High interest | 15% | 21% |

$\chi^2=19.88$, d.f.=2, $p<.001$

The differences are highly significant, a greater proportion of women having a high score compared to men.

Academic Relationships

(a) Contact with the teaching staff

Students were asked if they felt they had sufficient contact with the teaching staff. They could rate the contact as "Very poor", "Some contact but not enough" and "Sufficient contact".

Table 28 shows the distribution.

TABLE 28

| | Males (946) | Females (744) |
|---|---|---|
| Very poor contact | 32% | 25% |
| Some contact | 41% | 48% |
| Sufficient contact | 27% | 27% |

$\chi^2=7.87$, d.f.=2, $p<.025$

The difference between males and females is significant statistically, males being more discontented. More than a quarter of the students of either sex considered the contact with teaching staff as very poor.

(b) Contact with Director of Studies

Students were also asked to rate their feelings about the contact they had with the Director of Studies.

Table 29 shows the distribution.

TABLE 29

| | Males (940) | Females (744) |
|---|---|---|
| Very poor contact | 43% | 34% |
| Some contact | 21% | 27% |
| Sufficient contact | 36% | 39% |

$X^2=14.29$, d.f.=2, $p<.001$

The differences between males and females are significant statistically, males being more discontented. More than a third of the students of either sex considered that contact with the Director of Studies was very poor.

## Academic Problems

### (a) Decision about coming to University

Eighty-eight per cent of the males and 85% of the females were quite satisfied with their choice of the University. Nine per cent of males and 10% of females thought that they should have chosen some other University and 3% of men and 5% of women thought that they should not have come to University at all. The differences between males and females are not significant statistically.

### (b) Choice of Course

Students were asked if they were happy with the choice of course they had made when they came to University. If they were unhappy they were asked to mention if they had changed their course, intended to change or intended to continue.

Table 30 shows the distribution.

TABLE 30

| | Males (955) | Females (750) |
|---|---|---|
| Quite happy | 73% | 66% |
| Not happy - will continue | 17% | 18% |
| Not happy - will change | 9% | 14% |
| Not happy - have changed | 1% | 2% |

$\chi^2=1.66$, d.f.=1, n.s.

The chi square test was carried out to compare the satisfied with all the unsatisfied students. The male-female differences are not significant.

Health Problems: Both for physical illness and emotional disturbance the students could be divided into three categories: (1) No illness reported, (2) Illness reported but no consultation reported and (3) Illness reported and consultation claimed.

(a) Physical health

Students were asked if they had suffered from some sort of physical illness since coming to University and if they had consulted a doctor for it. Eleven males and 11 females did not answer this question.

Table 31 shows the distribution.

TABLE 31

| | Males (944) | Females (739) |
|---|---|---|
| No physical illness reported | 68% | 55% |
| Physical illness reported but no consultation | 9% | 13% |
| Reported and consulted | 23% | 32% |

Thirty-two per cent of males and 45% of females reported having suffered from a physical illness. The male-female differences in reporting physical illness are significant statistically.

$$\chi^2=32.44, \quad d.f.=1, \quad p<.001$$

Twenty-three per cent of males and 32% of females claimed to have consulted for physical illness. The male-female differences in consultation for physical illness are significant statistically.

$$\chi^2=20.16, \quad d.f.=1, \quad p<.001$$

Females, therefore, show greater propensity for reporting as well as consulting for physical illness.

(b) Emotional disturbance

The students were also asked if they had been emotionally or nervously unwell since coming to University. Table 32 shows the distribution. Thirty-seven males and 47 females did not answer this question. Out of those who answered the question, the results were as follows:-

TABLE 32

| | Males (918) | Females (703) |
|---|---|---|
| No emotional disturbance reported | 86% | 81% |
| Reported but no consultation | 11% | 13% |
| Reported and consulted | 3% | 6% |

Fourteen per cent of males and 19% of females reported emotional disturbance. The male-female differences in reporting emotional disturbance are significant statistically.

$$\chi^2=5.64, \quad d.f.=1, \quad p<.025$$

Three per cent of the males and 6% of the females claimed to have consulted for emotional disturbance. Putting it in different terms, 22% of the males who reported and 31% of the females who reported emotional disturbance also claimed to have consulted a doctor for it. The male-female differences in consultation for emotional disturbance are significant statistically.

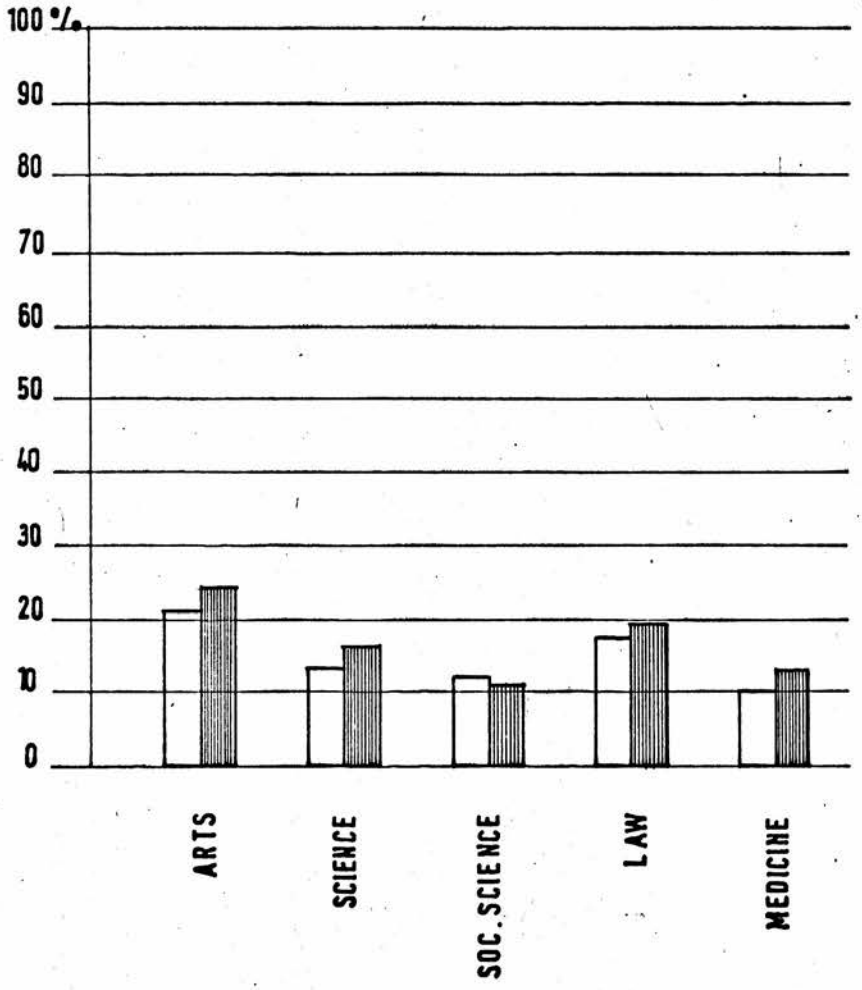
$$\chi^2=6.25, \quad d.f.=1, \quad p<.025$$

An analysis was also carried out to see if the students in different faculties differed with respect to reporting or consulting for emotional disturbance. Table 33 shows the results for reported emotional disturbance. (see also figure 5)

TABLE 33

| | Arts | Science | Social Science | Law | Medicine |
|---|---|---|---|---|---|
| Males | 21% | 13% | 12% | 17% | 10% |
| Females | 24% | 16% | 11% | 18% | 12% |

FIGURE. 5




INTERFACULTY DIFFERENCES IN REPORTED EMOTIONAL DISTURBANCES

The inter-faculty differences in reporting emotional disturbance are statistically significant, both in the case of males and females.

| | Males | Females |
|---|---|---|
| $\chi^2$ | 11.65 | 15.55 |
| d.f. | 4 | 4 |
| p | <.025 | <.005 |

Examination of the percentages shows that the reporting rate in the Arts Faculty is almost double the rate in the Medical Faculty, both for males and females.

Table 34 shows the consultation figures. The percentages are computed out of the total number who reported emotional disturbance, and not out of the total number of students in each faculty.

TABLE 34

| | Arts | Science | Social Science | Law | Medicine |
|---|---|---|---|---|---|
| Males | 26% | 22% | 30% | 17% | 14% |
| Females | 33% | 34% | 15% | 0% | 60% |

For males, reported consultation is comparatively high in the Faculties of Arts, Science and Social Science while it is relatively low in the Law and Medical Faculties.

In the case of females, consultation is highest in the Medical Faculty. In the Arts and Science Faculties about one third of those who reported emotional disturbance also reported consulting for it.

The rate is rather low at 15% in the Social Science Faculty, while none of the Law students reported having consulted for emotional disturbance.

The percentages have, however, been computed from very small numbers in at least some of the faculties and appropriate caution should be exercised in interpreting these results. For the same reason a chi square test was not carried out.

Summary of the information about students obtained from the 2nd Questionnaire

1. A greater proportion of women than men lived in hostels or student houses.
2. Roughly a quarter of the students (both males and females) expressed dissatisfaction with the accommodation.
3. More women than men were being financially helped by their parents. More men than women expressed dissatisfaction with their financial conditions.
4. Women had much better social relationships than men. Women had more friends of either sex and a greater proportion claimed to have a special friend of the opposite sex. Women take a greater interest in clubs, etc., while men take a greater interest in sports.
5. Nearly one third of the males and a quarter of the females considered their contact with teaching staff as "very poor". Nearly half the males and one third of the females considered contact with Directors of Studies as "very poor". Males expressed greater dissatisfaction with their academic relationships than females.
6. More than a quarter of the males and one third of the females expressed unhappiness with the choice of course they had made when they came to University.

7. More women (45%) than men (32%) claimed to have suffered from some sort of physical illness since coming to University. They also claimed to have consulted more often.
8. More women (19%) than men (14%) claimed to have suffered from emotional disturbance since coming to the University. The proportion of women who claimed to have consulted (out of those who reported 'emotional disturbance') is also higher than in men.
9. There are significant inter-faculty differences in reporting of 'emotional disturbance'. The Arts Faculty tops the list with 21% of the males and 24% of the females reporting 'emotional disturbance'. There are inter-faculty differences in claimed consultation also, but these cannot be interpreted with confidence because of small numbers involved.

The classification of the cohort:

The method by which the students were classified into four groups - Very successful, Moderately successful, Failures and Drop-outs - as well as the principle on which this classification was made has been discussed before in detail (page 67 ). To recapitulate very briefly:-

1. All the students who left the University before appearing for the September resit examination, whether or not they sat the June examination, were classified as Drop-outs.
2. All the students who failed one or more subjects at the end of the September resit examination were classified as Failures.
3. The rest of the students comprised the group of 'Successful' students. There were further divided into two categories of 'Very successful' and 'Moderately successful' students. This was done after:-

   (a) standardising the June examination results of the students, to eliminate inter-faculty differences.
   (b) obtaining the mean standardised mark of each student.
   (c) ranking the students on the mean standardised mark.
   (d) cutting out the top 25% of students in each faculty as the 'Very successful' students.
   (e) combining the rest of 75% with those successful in the September resit, forming the group of 'Moderately successful' students.

Table 35 and table 36 give the proportion of students falling into each category by sex and faculty.

TABLE 35

ACADEMIC PERFORMANCE (Males)

| | Arts (235) | Science (453) | Social Science (127) | Law (92) | Medicine (148) |
|---|---|---|---|---|---|
| Very successful | 17% | 16% | 18% | 12% | 18% |
| Moderately successful | 63% | 58% | 74% | 45% | 75% |
| Failures | 16% | 23% | 6% | 37% | 6% |
| Drop-outs | 5% | 4% | 3% | 7% | 2% |

TABLE 36

ACADEMIC PERFORMANCE (Females)

| | Arts (435) | Science (125) | Social Science (182) | Law (20) | Medicine (43) |
|---|---|---|---|---|---|
| Very successful | 13% | 11% | 16% | 5% | 28% |
| Moderately successful | 63% | 66% | 65% | 55% | 70% |
| Failures | 18% | 23% | 13% | 25% | 0% |
| Drop-outs | 6% | 0% | 7% | 15% | 2% |

A chi square test was carried out to see if the inter-faculty differences on academic performance were statistically significant. The Failures and Drop-outs were combined to get a sufficient number of individuals in each cell.

| | Males | Females |
|---|---|---|
| $\chi^2$ | 65.96 | 20.992 |
| d.f. | 8 | 8 |
| p | <.001 | <.01 |

The differences are statistically very significant, both in males and females. (See also figure 6 & 7 )

It was decided to carry out a similar exercise with unstandardised marks to examine how much difference the standardisation of marks had made to the ranking of students. It was considered sufficient to take only one faculty for this exercise and the Arts Faculty, being the largest, was chosen. Instead of using the standardised June examination results, the raw marks obtained in the different subjects taken by each student were added up and the mean raw mark was obtained (dividing the total marks by the number of subjects offered by the student). The students were ranked as before and the serial numbers in the top 25% were compared with the serial numbers in the top 25% in the standardised list.

It was observed that out of 97 who fell into the top 25% in the two lists, 82 pairs of serial numbers matched while 15 pairs, i.e. 30 students in all did not match and would, therefore, have been misclassified if raw marks had been used. This amounts to 8% misclassification* (out of a total of 387 students who passed the June examination).

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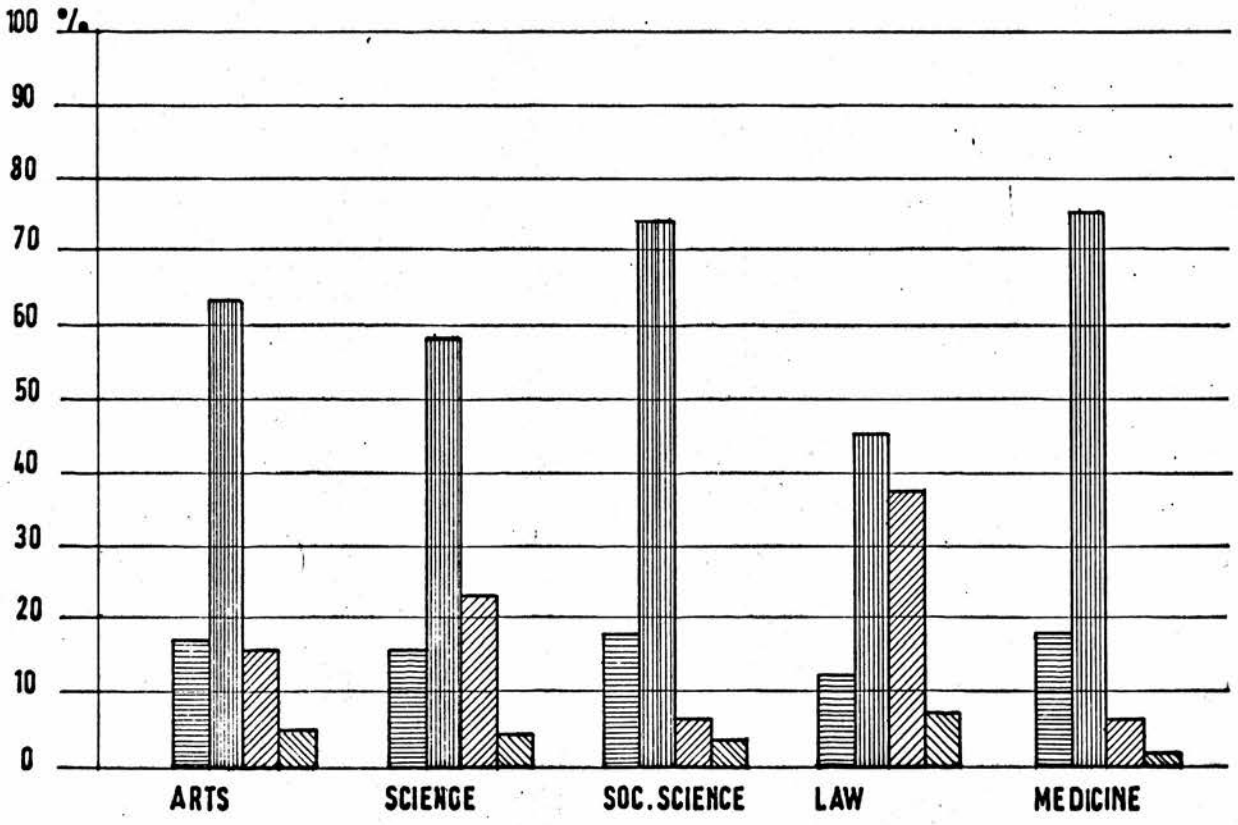
* Misclassification. The author makes this value judgement because of his belief that the standardised mark is a better assessment of the student's performance than the raw mark.

MALES.

FIGURE 6




VERY SUCCESSFUL

MODERATELY SUCCESSFUL

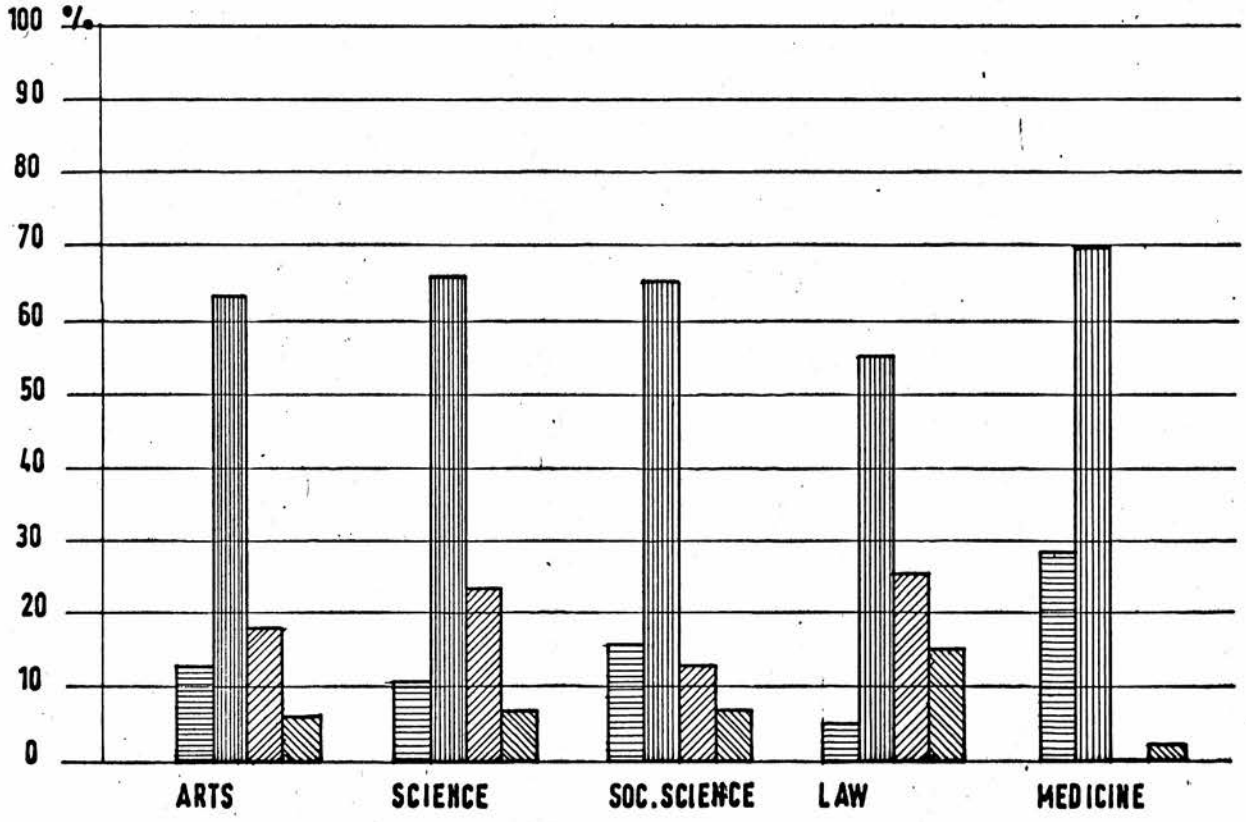
FAILURES

DROP_OUTS

INTERFACULTY DIFFERENCES ON SUCCESS FAILURE AND DROP_OUT

FEMALES

FIGURE 7




VERY SUCCESSFUL

MODERATELY SUCCESSFUL

FAILURES

DROP_OUTS

INTERFACULTY DIFFERANCES ON SUCCESS FAILURE AND DROP_OUT

## Chapter 9

## TESTING OF THE HYPOTHESES

The various hypotheses have been described before (page 50 ). To recapitulate very briefly, the items on which the hypotheses were based are given below:-

### 1ST QUESTIONNAIRE

1. Social and Demographic Factors: Sex, age, marital status, nominal religion, religious participation, nationality. Father's occupation - social class. Father's occupation - manual/non-manual, education achievement of the parents, civil status of the parents (broken home), birth order.

2. Attitudinal Factors: Student's attitude and parent's attitude towards coming to University. Student's commitment to the course.

3. Educational Factors: Type of school, type of certificate, school achievement score, size of school. Boarder/non-boarder, fee paying/ state supported, self-rating of student's academic and extra-curricular performance at school.

4. Psychological Factors: Personal disturbance score, self-rating of communication at home, self-rating of happiness at home, hostility and direction of hostility.

### 2ND QUESTIONNAIRE

1. Residential and Financial: Nature of residence, satisfaction with residence, nature of financial support and satisfaction with financial support.

2. Social Activities and Relationships: Interest in clubs and societies, interest in sports, number of friends (same and opposite sex), special friend of the opposite sex.

3. Academic Relationships: Contact with teaching staff, contact with Director of Studies.

4. Educational: Satisfaction with University and the course.

5. Health: Physical illness - reporting and consultation. Psychological disturbance - reporting and consultation.

Presentation of Results

A uniform scheme is followed throughout, which is as follows:-

1. The formal hypothesis is stated.
2. A 4 x N table is given to show the distribution of the cohort, 4 being the number of categories of academic performance and 'N' being the number of categories into which the operative factor has been divided. For the sake of clarity and simplicity, only percentages are given in these tables, with the absolute number from which percentages were derived given within brackets at the top of the column.
3. This is followed by the results of the particular statistical test used, along with the probability of the null hypothesis being correct.
4. A formal statement is made to the effect that the hypothesis is supported or not supported, as the case may be.
5. The results of the post hoc analysis, wherever carried out, are described.

## QUESTIONNAIRE I

## SOCIAL AND DEMOGRAPHIC FACTORS

### 1. Sex

Hypothesis: Males differ from females in their academic performance.

Table 37 shows the percentages of men and women in each category.

TABLE 37

SEX AND ACADEMIC PERFORMANCE

| | Males (1055) | Females (805) |
|---|---|---|
| Very successful | 16% | 14% |
| Moderately successful | 62% | 64% |
| Failures | 18% | 17% |
| Drop-outs | 4% | 5% |

$\chi^2 = 3.847$, d.f. = 3, n.s.

The hypothesis is not supported.

### 2. Age

Hypothesis: Age is related to academic performance.

The students were arbitrarily divided into three groups:-

1. 17 years old = Younger
2. 18 years and 19 years old = Middle
3. Above 20+ = Older

The three groups were then compared on academic performance. Table 38 shows the distribution.

TABLE 38

AGE AND ACADEMIC PERFORMANCE

| | Males | | | Females | | |
|---|---|---|---|---|---|---|
| | Younger (145) | Middle (796) | Older (107) | Younger (148) | Middle (609) | Older (47) |
| Very Successful | 17% | 17% | 9% | 14% | 15% | 2% |
| Moderately Successful | 61% | 62% | 60% | 66% | 63% | 64% |
| Failures | 17% | 18% | 22% | 15% | 17% | 24% |
| Drop-outs | 5% | 3% | 9% | 5% | 5% | 11% |
| | $\chi^2$=16.31, | d.f.=6, | p<.025 | $\chi^2$=9.83, | d.f.=6, | n.s. |

The hypothesis is supported in the case of males. The three age groups differ in their academic performance. The hypothesis is not supported in the case of females.

An examination of the percentages given in Table 37 and Table 38 shows that there is very little difference between the Younger and Middle age groups with respect to academic performance. A much higher proportion, however, seems to fail or drop out in the Older age group.

To clarify the issue further, the technique of partitioning the chi square was employed. A 2 x 3 contingency table was constructed to compare Successful and Unsuccessful students on the one hand and the three age groups on the other.

The results were as follows:-

MALES

| Component of chi square due to: | Chi square | d.f. | Significance Level |
|---|---|---|---|
| 1. Difference between Younger and Middle age groups | .101 | 1 | n.s. |
| 2. Difference between Younger + Middle age groups combined and the Older age groups | 6.956 | 1 | <.01 |

FEMALES

| Component of chi square due to: | Chi square | d.f. | Significance Level |
|---|---|---|---|
| 1. Difference between Younger and Middle age groups | .184 | 1 | n.s. |
| 2. Difference between Younger + Middle age groups combined and the Older age groups | 4.31 | 1 | <.05 |

The academic performance of the Younger age group does not differ from the Middle age group. However, both these groups combined have a better performance than the Older age group for both sexes; that is to say under twenties do better than over twenties.

3. Marital Status

Hypothesis: Unmarried students differ from married students in their academic performance.

All students who had married, whether or not they were living together, divorced or widowed, were considered together and formed a small group of

21 males and 15 females. This number, still being too small for detailed analysis, a 2 x 2 table, where all Successful students were compared with all Unsuccessful students, was employed. Table 39 shows the distribution.

TABLE 39

MARITAL STATUS AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | Single (1034) | Married (21) | Single (790) | Married (15) |
| Successful | 78% | 71% | 78% | 60% |
| Unsuccessful | 22% | 29% | 22% | 40% |
| | $\chi^2$=0.597, d.f.=1, n.s. | | $\chi^2$=2.85, d.f.=1, n.s. | |

The hypothesis is not supported, either for males or for females.

However, as the table shows, a higher percentage of married students were Unsuccessful, though this difference did not reach statistical significance.

4. Nationality

Hypothesis: (a) Nationality is related to academic performance.

(b) Foreign students have a poorer performance than British students.

(c) Scottish students have a poorer performance than the 'Other British' students.

Table 40 shows the distribution of the various nationalities into the categories of academic performance.

TABLE 40

NATIONALITY AND ACADEMIC PERFORMANCE

| | Males | | | Females | | |
|---|---|---|---|---|---|---|
| | Scottish (750) | Other British (260) | Foreign (43) | Scottish (568) | Other British (203) | Foreign (31) |
| Very Successful | 14% | 23% | 5% | 10% | 24% | 19% |
| Moderately Successful | 62% | 64% | 56% | 64% | 64% | 65% |
| Failures | 20% | 11% | 21% | 21% | 7% | 6% |
| Drop-outs | 4% | 2% | 19% | 5% | 5% | 10% |
| | $\chi^2$=46.74, d.f.=6, p<.001 | | | $\chi^2$=39.22, d.f.=6, p<.001 | | |

There is an overall significant difference amongst the various nationalities.

Only 13% of 'Other British' males Fail or Drop out, compared to 24% of Scottish and 40% of Foreign males.

For females, 12% of 'Other British' Fail or Drop out, compared to 26% of Scottish and 16% of the Foreign students.

To test the hypothesis, (b) and (c) partitioning of the chi square was carried out. The results were as follows:-

MALES

| Components of chi square due to: | Chi square | d.f. | Significance Level |
|---|---|---|---|
| 1. Difference between Scottish and 'Other British' students | 11.69 | 1 | <.001 |
| 2. Difference between British and Foreign students | 8.32 | 1 | <.005 |

FEMALES

| Components of chi square due to: | Chi square | d.f. | Significance Level |
|---|---|---|---|
| 1. Difference between Scottish and 'Other British' students | 17.23 | 1 | <.001 |
| 2. Difference between British and Foreign students | .666 | 1 | n.s. |

The hypothesis is supported in full for the males. For females it is partly supported, there being a significant difference between Scottish and 'Other British' females but none between British and Foreign females.

Examination of the percentages indicates that the academic performance of Foreign females actually lies somewhere in between that of the Scottish and 'Other British'.

5. Religion

Hypothesis: (a) Those who practice a religion and those who do not differ in their academic performance.

(b) The degree of participation in religious activities is related to academic performance.

Nominal Religion: Table 41 shows the distribution of the cohort. Those professing some kind of nominal religion, whether Protestant, Roman Catholic, Islam or Hindu were combined and compared with those who claimed to have 'No Religion'.

TABLE 41

RELIGION AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | Nominal Religion (881) | No Religion (169) | Nominal Religion (732) | No Religion (71) |
| Very Successful | 16% | 19% | 15% | 14% |
| Moderately Successful | 63% | 57% | 61% | 65% |
| Failures | 18% | 17% | 18% | 17% |
| Drop-outs | 3% | 7% | 6% | 4% |
| | $\chi^2$=7.09, d.f.=3, n.s. | | $\chi^2$=0.61, d.f.=3, n.s. | |

The hypothesis is not supported, either for males or females.

Religious Participation: Those who participated in religious activities at least twice a month were called Very Regular. Those who participated at least four times a year were referred to as Occasional participants. The third category was of students who participated less than four times a year; their participation being referred to as Rare. The fourth category was of the students who Never participated.

Tables 42 and 43 show the distribution.

TABLE 42

RELIGIOUS PARTICIPATION AND ACADEMIC PERFORMANCE (Males)

| | Very Regular (309) | Occasional (231) | Rare (277) | Never (236) |
|---|---|---|---|---|
| Very Successful | 20% | 12% | 16% | 16% |
| Moderately Successful | 61% | 67% | 62% | 60% |
| Failures | 17% | 19% | 18% | 17% |
| Drop-outs | 2% | 2% | 4% | 7% |

$\chi^2$=15.83, d.f.=9, n.s.

TABLE 43

RELIGIOUS PARTICIPATION AND ACADEMIC PERFORMANCE (Females)

| | Very Regular (335) | Occasional (213) | Rare (155) | Never (101) |
|---|---|---|---|---|
| Very Successful | 13% | 16% | 12% | 17% |
| Moderately Successful | 68% | 62% | 65% | 52% |
| Failures | 15% | 17% | 17% | 20% |
| Drop-outs | 4% | 5% | 7% | 11% |

$\chi^2$ =14.80, d.f.=9, n.s.

The hypothesis is not supported, either for males or for females.

It may be noted, however, that for both males and females the chi square value is just short of that which becomes significant at .05 level.

It appears from the percentages shown in Table 44 and Table 45 that the proportion of Failures is roughly similar in the four categories of Religious Participation. The proportion of Drop-outs, however, differs, being only 4% in the Very Regular and 11% in the Never category.

This special relationship between Drop-outs and Religious Participation is better illustrated if the proportions are worked out in a way opposite to the usual, that is to say, the percentage of Very Regular, Occasional, Rare and Never students are computed for each category of academic performance. Table 44 shows the results (percentages run horizontally instead of vertically).

TABLE 44

RELIGIOUS PARTICIPATION AND ACADEMIC PERFORMANCE (Males)

| | | Very Regular | Occasional | Rare | Never |
|---|---|---|---|---|---|
| Very Successful | (170) | 36% | 17% | 25% | 22% |
| Moderately Successful | (655) | 29% | 23% | 26% | 22% |
| Failures | (187) | 28% | 24% | 27% | 21% |
| Drop-outs | ( 41) | 28% | 10% | 21% | 41% |

Table 45 shows the results for females.

TABLE 45

RELIGIOUS PARTICIPATION AND ACADEMIC PERFORMANCE (Females)

| | | Very Regular | Occasional | Rare | Never |
|---|---|---|---|---|---|
| Very Successful | (114) | 39% | 31% | 16% | 15% |
| Moderately Successful | (513) | 44% | 26% | 20% | 20% |
| Failures | (134) | 38% | 28% | 20% | 15% |
| Drop-outs | ( 43) | 28% | 23% | 23% | 26% |

Sixty-two per cent of the male Drop-outs show Rarely or Never participation in religious activities, compared with only 48% of Failures, 48% of Moderately Successful and 47% of Very Successful students, the latter three proportions being very similar.

Forty-nine per cent of the female Drop-outs show low religious participation (Rare or Never) compared with 35% of Failures, 30% of Moderately Successful and 31% of Very Successful students, the latter three proportions again being very similar.

It seems as if Drop-outs do not form one end of the spectrum with respect to involvement in religious activities but are different from all the other three groups which do not differ among themselves.

To test this a posteriori hypothesis, the technique of partitioning the chi squares was adopted once again. High participants (Very Regular and Occasional) were compared with low participants (Rare or Never). The results were as follows:

MALES

| Component of chi square due to: | Chi square | d.f. | Significance Level |
|---|---|---|---|
| 1. Differences among Very Successful, Moderately Successful and Failures | .091 | 2 | n.s. |
| 2. Difference between the above three groups combined and the Drop-outs | 8.25 | 1 | <.005 |

FEMALES

| Component of chi square due to: | Chi square | d.f. | Significance Level |
|---|---|---|---|
| 1. Differences among Very Successful, Moderately Successful and Failures | .913 | 2 | n.s. |
| 2. Difference between the above three groups combined and the Drop-outs | 6.037 | 1 | <.025 |

The a posteriori hypothesis that Drop-outs are significantly different from all the other three groups, which are not different among themselves, is therefore supported both for males and females.

Future Drop-outs from the University claim a lower participation in religious activities compared to the other three groups of academic performance.

6. Civil Status of Parents

Hypothesis: Academic performance of students from broken homes is worse than that of students whose parents are living together.

For the purpose of analysis, all the students whose parents were separated, divorced or dead were considered together as one group and compared with those whose parents were living together.

Table 46 shows the distribution.

TABLE 46

| | Males | | Females | |
|---|---|---|---|---|
| | Parents Together (922) | Broken Home (133) | Parents Together (700) | Broken Home (103) |
| Very Successful | 16% | 20% | 15% | 9% |
| Moderately Successful | 63% | 56% | 63% | 70% |
| Failures | 18% | 19% | 17% | 12% |
| Drop-outs | 4% | 5% | 5% | 9% |

$\chi^2 = 3.53$, d.f.=3, n.s.

The hypothesis is not supported, either for males or for females.

7. Birth Order

Hypothesis: 'Only' children differ in academic performance from those who have siblings.

The students who had step-brothers or sisters were excluded from this analysis.

Table 47 shows the distribution.

TABLE 47

| | Males | | Females | |
|---|---|---|---|---|
| | Only child (125) | Others (856) | Only child (109) | Others (653) |
| Very Successful | 22% | 18% | 8% | 15% |
| Moderately Successful | 57% | 63% | 70% | 63% |
| Failures | 19% | 18% | 15% | 17% |
| Drop-outs | 3% | 4% | 7% | 5% |
| | $\chi^2$=4.23, d.f.=3, n.s. | | $\chi^2$ =4.89, d.f.=3, n.s. | |

The hypothesis is not supported, either for males or for females.

8. Social Class

Hypothesis: (a) Students from different social classes differ in their academic performance.

(b) Students whose father's occupation is manual differ on academic performance from students whose father's occupation is non-manual.

Social Classes: Tables 48 and 49 show the distribution separately for males and females. Because of the small numbers in Social Class IV and V the two were combined to form one group.

TABLE 48

SOCIAL CLASS AND ACADEMIC PERFORMANCE (Males)

| | Class I (208) | Class II (431) | Class III (236) | Class IV & V (82) |
|---|---|---|---|---|
| Very Successful | 16% | 16% | 14% | 20% |
| Moderately Successful | 63% | 61% | 65% | 65% |
| Failures | 16% | 19% | 19% | 10% |
| Drop-outs | 4% | 4% | 2% | 5% |

$\chi^2 = 9.24$, d.f.=9, n.s.

TABLE 49

SOCIAL CLASS AND ACADEMIC PERFORMANCE (Females)

| | Class I (211) | Class II (282) | Class III (183) | Class IV & V (62) |
|---|---|---|---|---|
| Very Successful | 17% | 16% | 13% | 8% |
| Moderately Successful | 68% | 65% | 59% | 56% |
| Failures | 13% | 15% | 21% | 29% |
| Drop-outs | 3% | 5% | 7% | 7% |

$\chi^2 = 20.37$, d.f.=9, $p<.025$

The hypothesis is not supported in the case of males but is supported in the case of females.

As the tables show, 36% of female students from Social Class IV and V fail or drop out while only 16% of the Social Class I females do so.

Father's Occupation

Table 50 shows the distribution.

TABLE 50

FATHER'S OCCUPATION (MANUAL/NON-MANUAL) AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | Non-Manual (717) | Manual (226) | Non-Manual (575) | Manual (152) |
| Very Successful | 17% | 15% | 15% | 13% |
| Moderately Successful | 63% | 61% | 66% | 55% |
| Failures | 17% | 20% | 15% | 24% |
| Drop-outs | 3% | 4% | 4% | 7% |
| | $\chi^2$=2.04, d.f.=3, n.s. | | $\chi^2$=10.96, d.f.=3, p<.025 | |

The hypothesis is proved for females but not for males.

9. Educational achievement of the parents

Hypothesis: The educational achievement of the parents is related to the students' academic performance.

The students were asked if their parents were University graduates. On the basis of their answers, the sample could be divided into the following groups:

1. Those with father only a graduate.
2. Those with mother only a graduate.
3. Those with both parents graduates.
4. Those with neither parent a graduate.

Tables 51 and 52 show the results:

TABLE 51

EDUCATIONAL ACHIEVEMENTS OF THE PARENTS AND ACADEMIC PERFORMANCE (Males)

| | Father only a graduate (189) | Mother only a graduate (27) | Both Parents graduates (65) | Neither parent a graduate (769) |
|---|---|---|---|---|
| Very Successful | 17% | 11% | 18% | 16% |
| Moderately Successful | 63% | 63% | 68% | 62% |
| Failures | 18% | 22% | 9% | 18% |
| Drop-outs | 2% | 4% | 5% | 4% |

$\chi^2 = 6.18$, d.f.=9, n.s.

TABLE 52

EDUCATIONAL ACHIEVEMENTS OF THE PARENTS AND ACADEMIC PERFORMANCE (Females)

| | Father only a graduate (162) | Mother only a graduate (33) | Both Parents graduates (72) | Neither parent a graduate (55) |
|---|---|---|---|---|
| Very Successful | 16% | 24% | 24% | 12% |
| Moderately Successful | 68% | 70% | 64% | 63% |
| Failures | 12% | 3% | 12% | 19% |
| Drop-outs | 4% | 3% | 0% | 6% |

$\chi^2$=24.82, d.f.=9, P .01

The hypothesis was supported for females but not for males.

25% of the females with neither parent a graduate fail or drop-out, compared to only 6% of those with mother only graduate, 16% of those with father only graduate and 12% of those with both parents graduates.

## MOTIVATIONAL FACTORS

### 1. Student's Attitude towards coming to University

Hypothesis: Students expressing a favourable attitude towards coming to University have a better academic performance than those not in favour.

Though the students answered the question on a five point scale ranging from 'much in favour' to 'much opposed', the categories were combined as there were too few who fell into the 'opposed' or 'much opposed' categories. 'Much in favour' and 'in favour' were combined and called IN FAVOUR. The students in the 'neutral', 'opposed' and 'much opposed' categories were combined and called NOT IN FAVOUR.

A 2 x 2 table was constructed when carrying out the chi square test. All Successful students were compared with all Unsuccessful students.

Table 53 shows the distribution.

TABLE 53

STUDENT'S ATTITUDE AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | In Favour (988) | Not in Favour (67) | In Favour (745) | Not in Favour (58) |
| Very Successful | 16% | 13% | 14% | 16% |
| Moderately Successful | 63% | 55% | 65% | 52% |
| Failures | 18% | 18% | 17% | 19% |
| Drop-outs | 3% | 14% | 5% | 14% |
| | $\chi^2=3.92$, d.f.=1, $p<.05$ | | $\chi^2=4.29$, d.f.=1, $p<.05$ | |

The hypothesis is supported both for males and females.

2. Father's Attitude towards University

Hypothesis: Father's attitude to the student coming to University is related to academic performance.

Once again the categories were combined so that the students whose fathers were in favour were compared with those whose fathers were not in favour.

However, as this was a non-directional hypothesis, the four categories of academic performance were kept separate.

Table 54 shows the distribution.

TABLE 54

FATHER'S ATTITUDE AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | In Favour (893) | Not in Favour (54) | In Favour (697) | Not in Favour (36) |
| Very Successful | 16% | 9% | 15% | 14% |
| Moderately Successful | 62% | 78% | 64% | 47% |
| Failures | 18% | 11% | 17% | 19% |
| Drop-outs | 4% | 2% | 4% | 19% |
| | $\chi^2$=5.447, d.f.=3, n.s. | | $\chi^2$=17.973, d.f.=3, p<.001 | |

The hypothesis is not supported in the case of males but is supported for females.

Thirty-eight per cent of the females who claimed that their fathers had an unfavourable attitude Failed or Dropped out, while only 21% of females with fathers in favour did likewise.

3. Mother's Attitude and Academic Performance

Hypothesis: Mother's attitude to the student coming to University is related to academic performance.

Table 55 shows the distribution.

TABLE 55

MOTHER'S ATTITUDE AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | In Favour (978) | Not in Favour (46) | In Favour (729) | Not in Favour (44) |
| Very Successful | 16% | 19% | 14% | 16% |
| Moderately Successful | 62% | 67% | 64% | 61% |
| Failures | 18% | 11% | 17% | 18% |
| Drop-outs | 4% | 2% | 5% | 5% |
| | $\chi^2$ =1.79, d.f.=3, n.s. | | $\chi^2$ =0.187, d.f.=3, n.s. | |

The hypothesis is not supported either for males or females.

4. Choice of Course and Academic Performance

Hypothesis: The students admitted to a course which they put as their first choice when applying to University have a better academic performance than those admitted to a course which is not their 'first choice'.

As the hypothesis was directional in nature, a chi square test was carried out after combining the categories so that all Successful students were compared with all Unsuccessful students.

Table 56 shows the distribution.

TABLE 56

CHOICE OF COURSE AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | 1st Choice (986) | Others (68) | 1st Choice (750) | Others (54) |
| Very Successful | 16% | 18% | 14% | 11% |
| Moderately Successful | 63% | 57% | 65% | 50% |
| Failures | 18% | 21% | 16% | 30% |
| Drop-outs | 4% | 4% | 5% | 9% |
| | $\chi^2$=0.45, d.f.=1, n.s. | | $\chi^2$=9.78, d.f.=1, p<.005 | |

The hypothesis is not supported in the case of males but is supported in the case of females.

Only 21% of the females who had their first choice accepted failed or dropped out compared to 39% of the others who had to go on to some other course. There is hardly any difference in the case of males.

5. Commitment to Future Career

Hypothesis: Students who have decided upon a future career differ in academic performance from those who are not 'committed'.

Table 57 shows the distribution.

TABLE 57

COMMITMENT TO FUTURE CAREER AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | Committed (487) | Not Committed (567) | Committed (304) | Not Committed (501) |
| Very Successful | 15% | 17% | 13% | 15% |
| Moderately Successful | 62% | 62% | 64% | 64% |
| Failures | 18% | 18% | 16% | 17% |
| Drop-outs | 5% | 3% | 6% | 5% |
| | $\chi^2$=1.42, d.f.=3, n.s. | | $\chi^2$=.99, d.f.=3, n.s. | |

The hypothesis is not supported either for males or for females.

## EDUCATIONAL FACTORS

1. Type of Certificate

Hypothesis: The students with G.C.E. have a better academic performance than those with S.C.E. only.

Foreign students were excluded from analysis. The rest were divided into two groups, one with S.C.E. only and the other with G.C.E., irrespective of whether or not they had S.C.E. As shown in Table 58 the two groups have been labelled 'S.C.E.' and 'G.C.E.' respectively. As the hypothesis is directional, all Successful students were compared with all Unsuccessful students when carrying out the chi square test.

TABLE 58

TYPE OF CERTIFICATE AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | S.C.E. (627) | G.C.E. (400) | S.C.E. (487) | G.C.E. (313) |
| Very Successful | 12% | 18% | 13% | 21% |
| Moderately Successful | 63% | 65% | 61% | 65% |
| Failures | 20% | 12% | 21% | 13% |
| Drop-outs | 5% | 6% | 5% | 1% |

$\chi^2 = 21.9$, d.f.=1, $p < .001$ $\chi^2 = 7.69$, d.f.=1, $p < .01$

The hypothesis is supported for both males and females.

It was proved before (page 123) that Scottish students had a worse academic performance than 'Other British' students. This could be due to the fact that the majority of Scottish students took S.C.E. while the majority of the 'Other British' students took G.C.E.

To see if the relation between nationality and academic performance was independent of the relation between type of certificate and the latter, an analysis of relationship between nationality and academic performance was carried out only on those students who came to University with G.C.E.

Table 59 shows the results.

TABLE 59

NATIONALITY AND ACADEMIC PERFORMANCE IN STUDENTS WITH G.C.E. ONLY

| | Males | | Females | |
|---|---|---|---|---|
| | Scottish (157) | Other British (227) | Scottish (124) | Other British (168) |
| Very Successful | 18% | 24% | 10% | 24% |
| Moderately Successful | 65% | 64% | 65% | 65% |
| Failures ) * Drop-outs) | 17% | 12% | 25% | 12% |
| | $\chi^2$=3.6, d.f.=2, n.s. | | $\chi^2$=16.2, d.f.=2, p<.001 | |

There is no significant difference in males but a very significant difference still exists in the case of females.

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* The Failures and Drop-outs were combined to get a significant number in each cell.

2. School Achievement Score

A scoring system was devised by which a composite 'score' could be assigned to each student, based on the grades achieved in the G.C.E. 'A' level or Scottish 'Highers' examination. The technique has been described before but, to recapitulate very briefly, it is as follows:-

For the 'A' level examination a score of 5, 4, 3, 2 and 1 was given respectively for grades A, B, C, D and E.

Scottish 'Highers' were scored 3, 2 and 1 for the grade A, B and C respectively. The scores received by each student with respect to the various subjects passed were then added up to form a composite - SCHOOL ACHIEVEMENT SCORE (S.A.S.).

Hypothesis: The students with high S.A.S. have a better academic performance than those with low S.A.S.

To test the hypothesis, one way analysis of variance was carried out. Students who had not taken G.C.E. nor S.C.E. were excluded from the analysis. The results were as follows:- (Table 60).

TABLE 60

S.A.S. AND ACADEMIC PERFORMANCE

| | | Very Successful | Moderately Successful | Failures | Drop-outs |
|---|---|---|---|---|---|
| Males | Mean | 12.475 | 10.097 | 7.994 | 8.828 |
| | S.D. | 4.538 | 4.392 | 2.481 | 3.769 |
| Females | Mean | 12.946 | 10.586 | 9.037 | 9.829 |
| | S.D. | 4.298 | 3.681 | 2.763 | 2.946 |

Analysis of variance gave the following results:-

Males

| Sum of squares | d.f. | Mean square |
|---|---|---|
| Between samples | 3 | 596.794 |
| Within samples | 1006 | 17.047 |
| Total | 1009 | |

F ratio = 35.008, $p<.001$

Females

| Sum of squares | d.f. | Mean square |
|---|---|---|
| Between samples | 3 | 324.562 |
| Within samples | 787 | 13.057 |
| Total | 790 | |

F ratio = 24.857, $p<.001$

The hypothesis is, therefore, supported for both males and females.

Having found an overall significance the means were compared, taking two groups at a time. Scheffe's test (Appendix B) was used for this purpose.

The results were as follows:-

| | Males | | Females | |
|---|---|---|---|---|
| | F ratio | P | F ratio | P |
| Very Successful and Moderately Successful | 43.56 | <.001 | 39.36 | <.001 |
| Very Successful and Failures | 99.78 | <.001 | 71.8 | <.001 |
| Very Successful and Voluntary Drop-outs | 22.55 | <.001 | 22.39 | <.001 |
| Moderately Successful and Failures | 21.48 | <.001 | 19.44 | <.001 |
| Moderately Successful and Drop-outs | 3.13 | <.025 | 1.66 | n.s. |
| Failures and Voluntary Drop-outs | 1.19 | n.s. | 1.5 | n.s. |

The results show that Very Successful students differ from all the other groups. Moderately Successful differ significantly from Failures. Moderately Successful females do not differ from the female Voluntary Drop-outs. Failures do not differ from Voluntary Drop-outs either in the case of males or in the case of females.

3. Type of School

Hypothesis: Type of school is related to academic performance.

Students from Scottish schools and 'Other British' schools were considered separately. They were divided into three groups each:

| Scottish | 'Other British' |
|---|---|
| 1. Senior Secondary | 1. Grammar |
| 2. Private or Independent | 2. Private or Independent |
| 3. Rest (Comprehensive, Junior Secondary, etc.) | 3. Rest (Comprehensive, Secondary Modern, etc.) |

The direct grant schools were considered along with private or independent schools. Students from schools outside the United Kingdom were excluded from the analysis.

Tables 61 and 62 show the distribution for the Scottish students.

TABLE 61

TYPE OF SCHOOL AND ACADEMIC PERFORMANCE (SCOTTISH STUDENTS) (Males)

| | Senior Secondary (483) | Private (202) | Rest (87) |
|---|---|---|---|
| Very Successful | 14% | 16% | 13% |
| Moderately Successful | 61% | 62% | 65% |
| Failures | 21% | 19% | 17% |
| Drop-outs | 4% | 3% | 5% |

$\chi^2$=2.45, d.f.=6, n.s.

TABLE 62

TYPE OF SCHOOL AND ACADEMIC PERFORMANCE (SCOTTISH STUDENTS) (Females)

| | Senior Secondary (355) | Private (136) | Rest (97) |
|---|---|---|---|
| Very Successful | 11% | 12% | 13% |
| Moderately Successful | 65% | 64% | 56% |
| Failures | 19% | 18% | 25% |
| Drop-outs | 5% | 6% | 7% |

$\chi^2$=3.14, d.f.=6, n.s.

The hypothesis is not supported either for males or females.

Table 63 shows the distribution for the 'Other British' students.

TABLE * 63

TYPE OF SCHOOL AND ACADEMIC PERFORMANCE ('OTHER BRITISH')

| | Males | | | Females | | |
|---|---|---|---|---|---|---|
| | Grammar (121) | Private (95) | Rest (16) | Grammar (96) | Private (82) | Rest (12) |
| Very Successful | 24% | 22% | 25% | 26% | 21% | 17% |
| Moderately Successful | 68% | 63% | 62% | 63% | 67% | 67% |
| Failures | 8% | 14% | 13% | 5% | 11% | 8% |
| Drop-outs | 0% | 1% | 0% | 6% | 1% | 8% |
| | *$X^2$=2.04, d.f.=2, n.s. | | | *$X^2$=.48, d.f.=2, n.s. | | |

The hypothesis is not supported either for males or for females.

4. Expenses on Education

Hypothesis: Students who were financially supported by their parents whilst at school differ in academic performance from those who were supported by the State.

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* Because of the small number in some cells, 'Grammar schools' and the 'Rest' categories were combined before carrying out the chi square test. Failures and Drop-outs were also combined.

To test the hypothesis the students were divided into three groups according to whether or not their education was paid for by their parents.

(a) Education paid for <u>wholly</u>

(b) Education paid for <u>partially</u>

(c) Education paid for <u>not at all</u>

Table 64 shows the distribution.

TABLE 64

EXPENSES ON EDUCATION AND ACADEMIC PERFORMANCE

| | Males | | | Females | | |
|---|---|---|---|---|---|---|
| | Wholly (319) | Partially (220) | None (512) | Wholly (225) | Partially (185) | None (389) |
| Very Successful | 15% | 16% | 17% | 13% | 19% | 12% |
| Moderately Successful | 62% | 63% | 62% | 68% | 62% | 62% |
| Failures | 19% | 16% | 18% | 15% | 14% | 19% |
| Drop-outs | 4% | 5% | 3% | 4% | 5% | 6% |
| | $\chi^2$=2.87, d.f.=6, n.s. | | | $\chi^2$=10.17, d.f.=6, n.s. | | |

<u>The hypothesis is not supported either for males or females</u>.

5. <u>Boarding at School</u>

Hypothesis: <u>Students who were 'Boarders' at school differ in their academic performance from those who were 'Day pupils'</u>.

Table 65 shows the distribution.

TABLE 65

BOARDING AT SCHOOL AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | Day Pupils (866) | Boarders (185) | Day Pupils (682) | Boarders (120) |
| Very Successful | 17% | 15% | 13% | 18% |
| Moderately Successful | 61% | 65% | 64% | 64% |
| Failures | 18% | 17% | 17% | 14% |
| Drop-outs | 4% | 3% | 6% | 3% |
| | $\chi^2$=1.59, d.f.=3, n.s. | | $\chi^2$=3.43, d.f.=3, n.s. | |

The hypothesis is not supported either for males or for females.

6. Size of School

Hypothesis: Students from large schools differ in their academic performance from those who come from small schools.

Schools with less than 500 students are referred to as small schools, those with 500 - 1,000 students as medium schools and those with more than 1,000 students as large schools.

Table 66 shows the distribution.

TABLE 66

SIZE OF SCHOOL AND ACADEMIC PERFORMANCE

| | Males | | | Females | | |
|---|---|---|---|---|---|---|
| | Small (232) | Medium (491) | Large (331) | Small (236) | Medium (381) | Large (187) |
| Very Successful | 19% | 17% | 13% | 15% | 14% | 12% |
| Moderately Successful | 61% | 63% | 62% | 67% | 61% | 65% |
| Failures | 18% | 16% | 20% | 15% | 17% | 18% |
| Drop-outs | 2% | 4% | 5% | 3% | 7% | 5% |
| | $X^2$=8.53, d.f.=9, n.s. | | | $X^2$=9.57, d.f.=9, n.s. | | |

The hypothesis is not supported either for males or females.

7. Satisfaction with School Performance

Hypothesis: Satisfaction with academic performance at school is related to the future academic performance at the University.

The students answered this question on a three point scale - 'Perfectly satisfied', 'Quite satisfied' and 'Less satisfied'.

Table 67 shows the distribution.

TABLE 67

SATISFACTION WITH PERFORMANCE AT SCHOOL AND ACADEMIC PERFORMANCE

| | Males | | | Females | | |
|---|---|---|---|---|---|---|
| | Perfectly Satisfied (189) | Quite Satisfied (618) | Less Satisfied (245) | Perfectly Satisfied (111) | Quite Satisfied (571) | Less Satisfied (123) |
| Very Successful | 24% | 16% | 10% | 25% | 13% | 11% |
| Moderately Successful | 62% | 64% | 60% | 60% | 67% | 54% |
| Failures | 12% | 17% | 24% | 7% | 16% | 27% |
| Drop-outs | 3% | 3% | 7% | 7% | 4% | 8% |
| | $\chi^2$=27.94, d.f.=9, p<.001 | | | $\chi^2$=31.19, d.f.=9, p<.001 | | |

The differences are very significant, both for males and females. The table also very clearly shows that as the level of dissatisfaction increases, the proportion of the Unsuccessful students rises.

The hypothesis is supported, both for males and females.

8. Interest in Sports

Hypothesis: Interest taken in the sporting activities at school is related to academic performance.

The students were grouped into three categories according to whether they took a 'more than average interest', an 'average interest' or 'less than average interest' in sports when at school.

Table 68 shows the distribution.

TABLE 68

PARTICIPATION IN SPORTS AND ACADEMIC PERFORMANCE

| | Males | | | Females | | |
|---|---|---|---|---|---|---|
| | Less than Average (393) | Average (367) | More than Average (363) | Less than Average (325) | Average (299) | More than Average (181) |
| Very Successful | 21% | 16% | 13% | 14% | 15% | 14% |
| Moderately Successful | 62% | 62% | 63% | 62% | 64% | 67% |
| Failures | 14% | 19% | 21% | 19% | 15% | 14% |
| Drop-outs | 4% | 4% | 4% | 6% | 6% | 4% |
| | $X^2$=11.91, d.f.=9, n.s. | | | $X^2$=3.12, d.f.=9, n.s. | | |

The hypothesis is not supported either for males or females.

9. Interest in Clubs and Societies

Hypothesis: Interest taken in clubs and societies at school is related to academic performance at the University.

The students answered the question on a three point scale - 'Less than average', 'Average' and 'More than average interest'.

Table 69 shows the distribution.

TABLE 69

PARTICIPATION IN SCHOOL CLUBS AND ACADEMIC PERFORMANCE

| | Males | | | Females | | |
|---|---|---|---|---|---|---|
| | Less Interest (227) | Average Interest (543) | More Interest (284) | Less Interest (124) | Average Interest (492) | More Interest (189) |
| Very Successful | 15% | 15% | 18% | 14% | 14% | 14% |
| Moderately Successful | 62% | 64% | 59% | 62% | 63% | 67% |
| Failures | 18% | 17% | 20% | 19% | 17% | 15% |
| Drop-outs | 5% | 4% | 3% | 6% | 6% | 4% |
| | $\chi^2$=4.51, | d.f.=6, | n.s. | $\chi^2$=1.58, | d.f.=6, | n.s. |

The hypothesis is not supported either for males or for females.

## PSYCHOLOGICAL FACTORS

### 1. Personal Disturbance Score

The students were asked to complete the 20 item Personal Disturbance scale of the Symptom Sign Inventory. They could score from 0-20 but there were not many who scored more than 5. The example of other workers like Philip ( 1968 ) was followed and the students divided into three groups.

(a) Not Disturbed, with a score of 0-1.

(b) Moderately Disturbed, with a score of 2-4.

(c) Disturbed, with a score of 5 or more.

Hypothesis: Personal Disturbance score is related to academic performance.

Tables 70 and 71 show the distribution.

TABLE 70

PERSONAL DISTURBANCE SCORE AND ACADEMIC PERFORMANCE (Males)

| | Not Disturbed (740) | Moderately Disturbed (238) | Disturbed (77) |
|---|---|---|---|
| Very Successful | 16% | 15% | 17% |
| Moderately Successful | 63% | 64% | 52% |
| Failures | 18% | 16% | 23% |
| Drop-outs | 3% | 5% | 8% |

$\chi^2$=8.22, d.f.=6, n.s.

TABLE 71

PERSONAL DISTURBANCE SCORE AND ACADEMIC PERFORMANCE (Females)

| | Not Disturbed (554) | Moderately Disturbed (206) | Disturbed (45) |
|---|---|---|---|
| Very Successful | 14% | 14% | 17% |
| Moderately Successful | 66% | 59% | 58% |
| Failures | 15% | 20% | 18% |
| Drop-outs | 5% | 7% | 7% |

$\chi^2=5.43$, d.f.=6, n.s.

The hypothesis is not supported either for males or for females.

However, on examination of the percentages given in the tables, it becomes apparent that some difference does exist between the various categories, though the overall chi square value does not reach significance.

Thirty-one per cent of the Disturbed males fail or drop out compared to 21% of the Not Disturbed and Moderately Disturbed. Twenty-five per cent of the Disturbed females and 27% of the Moderately Disturbed females fail or drop out compared with 20% of the females who are not Disturbed.

It seems as if the academic performance of the males starts showing signs of suffering once the disturbance score crosses the point of 5. The effect of the academic performance of females starts at a lower point of 2.

To examine the truth of the statement made above, partitioning of the chi squares was resorted to once again. All Successful students were compared with all Unsuccessful students. The results were as follows:-

Males

| Component of chi square due to: | Chi square | d.f. | Significance Level |
|---|---|---|---|
| 1. Difference between 'Not Disturbed' and 'Moderately Disturbed' | .116 | 1 | n.s. |
| 2. Difference between 'Disturbed' and the rest | 4.15 | 1 | <.05 |

Females

| Component of chi square due to: | Chi square | d.f. | Significance Level |
|---|---|---|---|
| 1. Difference between 'Not Disturbed' and 'Moderately Disturbed' | .147 | 1 | n.s. |
| 2. Difference between 'Disturbed' and the rest | 3.87 | 1 | <.05 |

It appears, therefore, that the males who are Disturbed, i.e. who score above 5, show a poorer academic performance than those who are Moderately Disturbed or Not Disturbed.

Disturbed females do not differ from Moderately Disturbed females, but both the groups show poorer performance than that shown by the Not Disturbed group.

2. Communication at Home

Students were asked if, compared to other families, it was easier or more difficult to discuss their personal problems at home.

Hypothesis: The ease with which personal problems can be discussed at home is related to the future academic performance.

To test the hypothesis the students were divided into three groups:-

(a) Those in whose home the discussion was Free.

(b) Those in whose home the discussion was About the Same as in other families.

(c) Those in whose home the discussion was Difficult.

Table 72 shows the distribution.

TABLE 72

DISCUSSION OF PERSONAL PROBLEMS AND ACADEMIC PERFORMANCE

| | Males | | | Females | | |
|---|---|---|---|---|---|---|
| | Free (258) | Same (647) | Difficult (134) | Free (285) | Same (123) | Difficult (93) |
| Very Successful | 18% | 14% | 25% | 15% | 12% | 19% |
| Moderately Successful | 57% | 66% | 54% | 64% | 64% | 62% |
| Failures | 20% | 17% | 16% | 16% | 17% | 13% |
| Drop-outs | 5% | 3% | 4% | 5% | 6% | 5% |
| | $\chi^2$=16.68, d.f.=6, p<.025 | | | $\chi^2$=4.75, d.f.=6, n.s. | | |

The hypothesis is supported for males but not for females.

Examination of the percentages in the table shows that the group claiming to have free discussion has in fact a higher proportion of Unsuccessful students than the other groups, and the group claiming difficulty in discussion of personal problems has the highest proportion of Very Successful students.

This is true both for males and females, though the difference fails to reach significance in the case of females.

3. Happiness at Home

Hypothesis: Happiness at home is related to academic performance.

The students described their home as 'Happier than most', 'About the same' (as most) or 'Less happy than most'.

Tables 73 and 74 show the distribution.

TABLE 73

HAPPINESS AT HOME AND ACADEMIC PERFORMANCE (Males)

| | Happier than most (385) | About the same (612) | Less happy than most (49) |
|---|---|---|---|
| Very Successful | 16% | 15% | 29% |
| Moderately Successful | 64% | 62% | 47% |
| Failures | 16% | 19% | 18% |
| Drop-outs | 4% | 4% | 6% |

$\chi^2$=8.54, d.f.=6, n.s.

TABLE 74

HAPPINESS AT HOME AND ACADEMIC PERFORMANCE (Females)

| | Happier than most (342) | About the same (424) | Less happy than most (33) |
|---|---|---|---|
| Very Successful | 15% | 14% | 12% |
| Moderately Successful | 65% | 64% | 58% |
| Failures | 15% | 17% | 18% |
| Drop-outs | 5% | 5% | 12% |

$\chi^2=4.06$, d.f.=6, n.s.

The hypothesis is not supported either for males or for females.

Examination of the percentages in the tables above indicates that males and females differ with respect to the relationship between happiness at home and academic performance. The group 'Less happy than most' has the highest proportion of Very Successful students amongst the males. The group 'Less happy than most' has the highest proportion of Unsuccessful students amongst the females. The difference between this group and the others however does not reach significance either in males or females.

4. Total Hostility and Direction of Hostility

This was measured by the Hostility and Direction of Hostility Test (Caine et al, 1967).

Hypothesis: (a) Total Hostility is related to future academic performance.

(b) Direction of Hostility is related to academic performance.

To test the hypothesis, one way analysis of variance was carried out.

(a) Total Hostility

Table 75 shows the means and standard deviations for the four groups of academic performance.

TABLE 75

TOTAL HOSTILITY AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | Mean | S.D. | Mean | S.D. |
| Very Successful | 17.02 | 5.56 | 17.80 | 5.49 |
| Moderately Successful | 16.84 | 5.83 | 17.45 | 5.46 |
| Failures | 17.48 | 6.18 | 17.67 | 6.08 |
| Drop-outs | 18.39 | 5.27 | 18.72 | 5.94 |

The results of the one way analysis of variance were as follows:-

Males

| | Sum of Squares | d.f. | Mean Square |
|---|---|---|---|
| Between groups | 139.001 | 3 | 46.33 |
| Within groups | 37764.988 | 1048 | 34.126 |

F ratio = 1.357, n.s.

Females

| | Sum of Squares | d.f. | Mean Square |
|---|---|---|---|
| Between groups | 70.878 | 3 | 23.626 |
| Within groups | 25072.185 | 799 | 31.418 |

F ratio = .752, n.s.

Hypothesis (a) is not supported. Total hostility is not related to academic performance.

Each sub-scale of the Hostility and Direction of Hostility Questionnaire was taken one at a time and its relationship with academic performance was examined.

For males no statistically significant difference was found amongst the four groups of academic performance with respect to the Self Criticism scale, Delusional Guilt scale and the Criticism of Others scale. The Acting out Hostility scale and the Delusional Hostility scale, however, showed an overall significant difference between the four groups. The results were as follows:-

TABLE 76

ACTING OUT HOSTILITY (Males)

| | Very Successful | Moderately Successful | Failures | Drop-outs |
|---|---|---|---|---|
| Mean | 4.8 | 4.54 | 5 | 4.88 |
| S.D. | 2.34 | 2.18 | 2.25 | 2.12 |

F ratio = 2.61, $p<.05$

DELUSIONAL HOSTILITY (Males)

| | Very Successful | Moderately Successful | Failures | Drop-outs |
|---|---|---|---|---|
| Mean | .95 | .964 | 1.129 | 1.53 |
| S.D. | 1.13 | .973 | 1.01 | 1.73 |

F ratio = 4.785, $p<.001$

The Moderately Successful have the lowest mean Acting out Hostility. Mean Delusional Hostility is the lowest in the Very Successful and the highest in the Drop-outs.

For females, none of the sub-scales showed any relationship with the academic performance.

Direction of Hostility

Table 77 shows the means and standard deviations for each group of academic performance.

TABLE 77

DIRECTION OF HOSTILITY AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | Mean | S.D. | Mean | S.D. |
| Very Successful | -.49 | 9.1 | +3.33 | 3.10 |
| Moderately Successful | +.36 | 5.94 | +3.52 | 5.56 |
| Failures | -.62 | 6.24 | +4.08 | 5.59 |
| Drop-outs | 0 | 6.19 | +3.62 | 8.22 |

The results of the one way analysis of variance were as follows:-

Males

| | Sum of Squares | d.f. | Mean Square |
|---|---|---|---|
| Between groups | 173.880 | 3 | 57.96 |
| Within groups | 37647.850 | 1044 | 36.06 |

F ratio = 1.61, n.s.

Females

| | Sum of Squares | d.f. | Mean Square |
|---|---|---|---|
| Between groups | 65.110 | 3 | 21.71 |
| Within groups | 26055.139 | 800 | 32.57 |

F ratio = 0.67, n.s.

The hypothesis is not supported either for males or for females.

Direction of Hostility is not related to academic performance.

## QUESTIONNAIRE II

## RESIDENTIAL AND FINANCIAL

1. Type of Accommodation

Hypothesis: The type of accommodation is related to the academic performance.

To test the hypothesis, students were divided into three categories:-

(1) Those who lived in hostels or student houses (referred to as Hostels).

(2) Those who lived in flats or digs (referred to as Lodgings).

(3) Those who lived at home with parents or relatives (referred to as Home).

Table 78 shows the distribution.

TABLE 78

TYPE OF ACCOMMODATION AND ACADEMIC PERFORMANCE

| | Males | | | Females | | |
|---|---|---|---|---|---|---|
| | Hostels (288) | Lodgings (316) | Home (351) | Hostels (300) | Lodgings (224) | Home (226) |
| Very Successful | 17% | 15% | 17% | 19% | 13% | 11% |
| Moderately Successful | 63% | 65% | 61% | 63% | 65% | 68% |
| Failures | 17% | 17% | 18% | 16% | 19% | 17% |
| Drop-outs | 3% | 3% | 4% | 2% | 4% | 4% |
| | $\chi^2$ =1.37, d.f.=6, n.s. | | | $\chi^2$ =9.48, d.f.=6, n.s. | | |

The hypothesis is not supported either for males or females.

2. Change of Residence

Hypothesis: Changes of residence are related to academic performance.

The students were divided into two groups, (a) those who had made no change, and (b) those who had made one or more changes in their accommodation since coming to the University.

The following table gives the distribution. (Table 79).

TABLE 79

CHANGE IN ACCOMMODATION AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | Change (162) | No Change (789) | Change (119) | No Change (627) |
| Very Successful | 14% | 15% | 16% | 16% |
| Moderately Successful | 66% | 64% | 62% | 63% |
| Failures | 18% | 17% | 18% | 17% |
| Drop-outs | 2% | 4% | 4% | 4% |
| | $\chi^2$=2.36, d.f.=3, n.s. | | $\chi^2$=3.17, d.f.=3, n.s. | |

The hypothesis is not supported either for males or females.

3. Satisfaction with Living Arrangements

Hypothesis: Satisfaction with living arrangements is related to academic performance.

The students were divided into three groups, (a) satisfied with the accommodation, (b) dissatisfied but would continue, and (c) dissatisfied and would change.

To test the hypothesis the satisfied students were compared with all dissatisfied students, the latter irrespective of whether they wanted to continue with or change the accommodation. Because of small numbers, Drop-outs were combined with the Failure group in the case of females.

Tables 80 and 81 show the distribution.

TABLE 80

SATISFACTION WITH ACCOMMODATION AND ACADEMIC PERFORMANCE (Males)

| | Satisfied (692) | Dissatisfied but would continue (129) | Dissatisfied and would change (131) |
|---|---|---|---|
| Very Successful | 17% | 14% | 15% |
| Moderately Successful | 63% | 63% | 61% |
| Failures | 17% | 19% | 19% |
| Drop-outs | 3% | 5% | 5% |

$\chi^2$=2.76, d.f.=3, n.s.

TABLE 81

SATISFACTION WITH ACCOMMODATION AND ACADEMIC PERFORMANCE (Females)

| | Satisfied (563) | Dissatisfied but would continue (88) | Dissatisfied and would change (98) |
|---|---|---|---|
| Very Successful | 16% | 16% | 8% |
| Moderately Successful | 64% | 63% | 73% |
| Failures | 16% | 20% | 18% |
| Drop-outs | 4% | 1% | 1% |

$\chi^2 = 1.72$, d.f.=2, n.s.

The hypothesis is not supported either for males or females.

4. Financial Arrangements

Hypothesis: The nature of financial support is related to academic performance.

To test the hypothesis, the students were divided into two groups:-

(1) Those who were living only on a grant or a bursary.

(2) Those who were receiving financial help from parents, along with or without a grant, etc.

Table 82 shows the distribution.

TABLE 82

FINANCIAL SUPPORT AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | Grant etc. only (462) | Support from parents (493) | Grant etc. only (299) | Support from parents (451) |
| Very Successful | 17% | 16% | 12% | 17% |
| Moderately Successful | 63% | 63% | 63% | 66% |
| Failures | 17% | 18% | 21% | 15% |
| Drop-outs | 3% | 4% | 4% | 3% |
| | $\chi^2$=1.05, d.f.=3, n.s. | | $\chi^2$=8.2, d.f.=3, p<.05 | |

The hypothesis is supported for females but not for males.

Twenty-five per cent of the females on grants etc. only fail or drop out while only 18% of those who receive financial support from parents are unsuccessful.

5. Satisfaction with Financial Support

Hypothesis: The satisfaction with financial support is related to academic performance.

To test the hypothesis, the students were divided into two groups:-

(1) Those who were satisfied.

(2) Those who were dissatisfied, i.e. considered the financial condition a source of stress to themselves, to their parents, or both.

Table 83 shows the distribution.

TABLE 83

SATISFACTION WITH FINANCIAL SUPPORT AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | Satisfied (738) | Dissatisfied (217) | Satisfied (630) | Dissatisfied (120) |
| Very Successful | 17% | 14% | 16% | 8% |
| Moderately Successful | 63% | 62% | 65% | 65% |
| Failures | 16% | 21% | 16% | 23% |
| Drop-outs | 4% | 3% | 3% | 4% |
| | $\chi^2$=3.67, d.f.=3, n.s. | | $\chi^2$=6.58, d.f.=3, n.s. | |

The hypothesis is not supported either for males or for females.

## SOCIAL ACTIVITIES AND RELATIONSHIPS

### 1. Interest in Clubs and Societies

The degree of interest was measured with a simple self-rating scale which has been described before (page 60 ). Each student received a 'score' calculated by adding up the ratings with respect to each club or society the student had taken part in during his stay at the University. 'High' scores meant a greater interest in these activities, and vice-versa.

Hypothesis: High scorers on the 'Clubs and Societies' scale differ from Low scorers in their academic performance.

To test the hypothesis, students were divided into two groups, 'High scorers' and 'Low scorers'. The dividing line was the score which was nearest to the "median value" for the scores achieved by all the students.

The "median" was 2.22 in the case of males and 2.78 in the case of females. The nearest whole number was 2 for males and 3 for females. All those who scored 2 or less were called 'Low scorers' and all those who scored 3 or more were called 'High scorers'.

Table 84 shows the distribution.

TABLE 84

'CLUBS AND SOCIETIES' SCORE AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | Low Scorers (419) | High Scorers (536) | Low Scorers (390) | High Scorers (360) |
| Very Successful | 17% | 16% | 13% | 16% |
| Moderately Successful | 59% | 59% | 62% | 68% |
| Failures | 21% | 19% | 20% | 14% |
| Drop-outs | 3% | 5% | 5% | 2% |
| | $\chi^2$=7.12, d.f.=3, n.s. | | $\chi^2$ =8.26, d.f.=3, p<.05 | |

The hypothesis is not supported in the case of males but is supported females.

Only 16% of the female 'High scorers' Fail or Drop out as against 25% of the female 'Low scorers'. No difference is observed in the case of the males, the 'High scorers' showing the same proportion of Unsuccessful students as the 'Low scorers'.

2. Sports Score

A system similar to that used in the case of clubs and societies was devised to score the interest in sports.

Hypothesis: High scorers on the 'Sports' scale will differ from Low scorers in their academic performance.

The "median" was 2.01 in the case of males and 1.29 in the case of females. Those males scoring 1 or less were termed 'Low scorers' and those scoring 2 or more were called 'High scorers'. Females scoring 1 or more were the 'High scorers'; those scoring 0 were the 'Low scorers'.

Table 85 shows the distribution.

TABLE 85

'SPORTS' SCORE AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | Low Scorers (460) | High Scorers (595) | Low Scorers (418) | High Scorers (332) |
| Very Successful | 14% | 15% | 15% | 14% |
| Moderately Successful | 64% | 68% | 61% | 70% |
| Failures | 17% | 15% | 21% | 12% |
| Drop-outs | 5% | 2% | 3% | 4% |
| | $\chi^2$=11.81, d.f.=3, p<.01 | | $\chi^2$=9.92, d.f.=3, p<.02 | |

The hypothesis is supported both for males and females.

If the percentages in the case of males are computed to show the proportion of low scorers in each category of academic performance, 42% of the Very Successful, 49% of the Moderately Successful and 46% of the Failures are low scorers, while 70% of the Voluntary Drop-outs are low scorers. The difference is confirmed when, on partitioning the chi squares, no statistically significant difference is found amongst Very Successful, Moderately Successful and Failures, while on combining these three groups and comparing them with Drop-outs the difference is statistically significant at .01 level. This seems to be another instance where Drop-outs are qualitatively different from the other three groups.

3. Number of Friends (Same Sex)

Hypothesis: The number of friends of the same sex is related to academic performance.

The students were asked to give the number of friends they had at the University, i.e. those whom they met out of classes once a week or more. Unfortunately, quite a number of the students misunderstood the question and qualified their answers in various ways (e.g. 5 at University and 3 at home or 2 very close friends and 5 not so close). This made it necessary to exclude them (33 males and 32 females) from the analysis.

The "median value" in the case of males was 5.35 and in the case of females 4.95. The nearest whole number in both cases was 5. Therefore, all who had reported 5 or less friends were considered as having 'few friends' and all those having 6 or more were considered as having 'many friends'.

Table 86 shows the distribution.

TABLE 86

NUMBER OF FRIENDS (SAME SEX) AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | Few Friends (418) | Many Friends (504) | Few Friends (364) | Many Friends (354) |
| Very Successful | 17% | 16% | 15% | 14% |
| Moderately Successful | 63% | 64% | 67% | 64% |
| Failures | 16% | 16% | 15% | 19% |
| Drop-outs | 4% | 4% | 3% | 3% |
| | $\chi^2$=3.73, d.f.=3, n.s. | | $\chi^2$=1.8, d.f.=3, n.s. | |

The hypothesis is not supported either for males or for females.

4. Number of Friends (Opposite Sex)

Hypothesis: The number of friends of the opposite sex is related to academic performance.

To test the hypothesis, the students were again divided into two groups - those with few friends and those with many friends, taking median as the cut-off point. The "median value" for males was 2.47 and for females 2.69. The nearest whole number was 2 in the case of males and 3 in the case of females. All males with 2 or less friends were categorised as having 'few friends' and those with 3 or more as having 'many friends'. All females with 3 or less friends were categorised as having 'few friends' and those with 4 or more friends as having 'many friends'.

Table 87 shows the distribution.

TABLE 87

NUMBER OF FRIENDS (OPPOSITE SEX) AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | Few Friends (522) | Many Friends (391) | Few Friends (384) | Many Friends (338) |
| Very Successful | 19% | 12% | 14% | 15% |
| Moderately Successful | 63% | 64% | 65% | 64% |
| Failures | 15% | 20% | 18% | 17% |
| Drop-outs | 3% | 4% | 3% | 4% |
| | $\chi^2$=9.90, d.f.=3, p<.025 | | $\chi^2$=1.08, d.f.=3, n.s. | |

The hypothesis is supported for males but not for females.

Twenty-four of the male students with 'many friends' fall into the Failure or Drop-out groups compared with only 18% of those with 'few friends'. There is no difference in the case of females.

5. Special Friend of the Opposite Sex

Hypothesis: Those with a special friend of the opposite sex and those without one differ in academic performance.

Twenty-two males and 16 females were married and therefore the question was not applicable to them. Ten males and 12 females did not answer this question.

Table 88 shows the distribution for the rest.

TABLE 88

SPECIAL FRIEND OF THE OPPOSITE SEX AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | With Special Friend (432) | Without Special Friend (491) | With Special Friend (411) | Without Special Friend (316) |
| Very Successful | 10% | 20% | 12% | 18% |
| Moderately Successful | 66% | 63% | 65% | 65% |
| Failures | 20% | 14% | 18% | 16% |
| Drop-outs | 4% | 3% | 5% | 1% |
| | $\chi^2$=11.88, d.f.=3, p<.01 | | $\chi^2$=10.63, d.f.=3, p<.02 | |

The hypothesis is supported both for males and females.

Both for males as well as females, those with a special friend of the opposite sex show a higher proportion of Failure and Drop-out.

## ACADEMIC RELATIONSHIPS

1. Contact with Teaching Staff

Hypothesis: Student's perception of the contact with teaching staff is related to academic performance.

Students were divided into three categories:-

(1) Those claiming Very Poor Contact.

(2) Those claiming some contact, but Not Enough.

(3) Those claiming to have Sufficient Contact.

Table 89 shows the distribution.

TABLE 89

CONTACT WITH TEACHING STAFF AND ACADEMIC PERFORMANCE

| | Males | | | Females | | |
|---|---|---|---|---|---|---|
| | Very Poor (297) | Not Enough (398) | Sufficient (251) | Very Poor (189) | Not Enough (352) | Sufficient (203) |
| Very Successful | 15% | 18% | 15% | 10% | 16% | 17% |
| Moderately Successful | 60% | 63% | 66% | 66% | 63% | 66% |
| Failures | 20% | 17% | 16% | 19% | 18% | 14% |
| Drop-outs | 5% | 2% | 4% | 5% | 3% | 3% |
| | $X^2$=8.53, d.f.=6, n.s. | | | $X^2$=7.24, d.f.=6, n.s. | | |

The hypothesis is not supported either for males or for females.

2. Contact with Director of Studies

Hypothesis: Student's perception of the contact with the Director of Studies is related to academic performance.

Students were divided into three categories once again, that is those who claimed Very Poor Contact, those who claimed some contact but Not Enough and those who claimed Sufficient Contact.

Table 90 shows the distribution.

TABLE 90

CONTACT WITH DIRECTOR OF STUDIES AND ACADEMIC PERFORMANCE

| | Males | | | Females | | |
|---|---|---|---|---|---|---|
| | Very Poor (404) | Not Enough (199) | Sufficient (337) | Very Poor (255) | Not Enough (197) | Sufficient (292) |
| Very Successful | 17% | 18% | 14% | 16% | 12% | 16% |
| Moderately Successful | 65% | 60% | 62% | 64% | 67% | 64% |
| Failures | 15% | 18% | 20% | 16% | 19% | 16% |
| Drop-outs | 2% | 4% | 4% | 4% | 2% | 4% |
| | $\chi^2$=7.73, d.f.=6, n.s. | | | $\chi^2$=4.44, d.f.=6, n.s. | | |

The hypothesis is not supported either for males or for females.

## EDUCATIONAL FACTORS

1. Satisfaction with the University

Hypothesis: Satisfaction with University is related to academic performance.

Students were divided into three categories; those who were Satisfied, those who were Not Satisfied and thought that they should have gone to another University, and those who were Not Satisfied and thought they should not have come to University at all.

Tables 91 and 92 show the distribution. The two categories of Not Satisfied students are respectively referred to as 'Not Satisfied (a)' and 'Not Satisfied (b)'.

As the numbers in these two categories were small, they were combined when carrying out a chi square test so that all Satisfied students were compared with all those who were Not Satisfied.

TABLE 91

SATISFACTION WITH UNIVERSITY AND ACADEMIC PERFORMANCE (Males)

| | Satisfied (828) | Not Satisfied (a) (86) | Not Satisfied (b) (31) |
|---|---|---|---|
| Very Successful | 17% | 17% | 3% |
| Moderately Successful | 65% | 52% | 46% |
| Failures | 16% | 22% | 33% |
| Drop-outs | 2% | 8% | 17% |

$\chi^2=22.22$, d.f.=3, $p<.001$

TABLE 92

SATISFACTION WITH UNIVERSITY AND ACADEMIC PERFORMANCE (Females)

| | Satisfied | Not Satisfied (a) | Not Satisfied (b) |
|---|---|---|---|
| | (629) | (87) | (37) |
| Very Successful | 15% | 16% | 5% |
| Moderately Successful | 66% | 68% | 39% |
| Failures | 16% | 14% | 32% |
| Drop-outs | 2% | 3% | 24% |

$\chi^2=18.21$, d.f.=3, $p<.001$

The hypothesis is supported both for males and females.

The differences are very significant both in the case of males as well as females.

An examination of the percentages in Table 91 and 92 shows that the a priori decision to compare all Satisfied students with all Unsatisfied students might have clouded the issue to a certain extent.

On partitioning the chi square, there is a statistically significant difference between all the three categories in the case of males. In the case of females, however, there is no statistically significant difference between Satisfied students and those Unsatisfied students who wanted to go to some other University. If these two groups are combined and compared with those who did not want to come to University at all the difference becomes very significant.

2. Satisfaction with Course of Studies

Hypothesis: Satisfaction with course of studies is related to academic performance.

Students fell into four categories; those who were Quite Happy with the course, those who were Not Happy and intended to continue, those who were Not Happy and intended to change and those who were Not Happy and had changed the course.

Tables 93 and 94 show the distribution. When carrying out the chi square test, the latter three categories were combined so that all students who were Quite Happy were compared with all who were Not Happy.

TABLE 93

SATISFACTION WITH COURSE OF STUDIES AND ACADEMIC PERFORMANCE (Males)

| | Quite Happy (691) | Not Happy will Continue (165) | Not Happy will Change (87) | Not Happy have Changed (12) |
|---|---|---|---|---|
| Very Successful | 18% | 9% | 16% | 20% |
| Moderately Successful | 67% | 56% | 49% | 50% |
| Failures | 14% | 26% | 29% | 30% |
| Drop-outs | 2% | 9% | 6% | 0% |

$\chi^2=46.76$, d.f.=3, $p<.001$

TABLE 94

SATISFACTION WITH COURSE OF STUDIES AND ACADEMIC PERFORMANCE (Females)

| | Quite Happy (489) | Not Happy will Continue (135) | Not Happy will Change (104) | Not Happy have Changed (15) |
|---|---|---|---|---|
| Very Successful | 16% | 13% | 8% | 6% |
| Moderately Successful | 67% | 57% | 62% | 69% |
| Failures | 15% | 24% | 21% | 6% |
| Drop-outs | 1% | 5% | 9% | 19% |

$\chi^2=27.74$, d.f.=3, $p<.001$

The hypothesis is supported both for males and females.

The total number of males and females who were Not Happy and had changed their course is very small and, therefore, the percentages in that category should be interpreted with caution.

## HEALTH AND ILLNESS

### 1. Physical Illness

Students were asked if they had suffered from any physical illness since coming to University and if they had consulted a doctor for this.

Hypothesis: (a) Reported physical illness is related to academic performance.

(b) Reported consultation for physical illness is related to academic performance.

Table 95 shows the distribution.

TABLE 95

REPORTED PHYSICAL ILLNESS AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | Not Reported (647) | Reported (297) | Not Reported (407) | Reported (333) |
| Very Successful | 15% | 18% | 16% | 15% |
| Moderately Successful | 66% | 57% | 66% | 67% |
| Failures | 16% | 21% | 15% | 16% |
| Drop-outs | 3% | 4% | 3% | 2% |
| | $\chi^2$=5.89, d.f.=3, n.s. | | $\chi^2$=3.27, d.f.=3, n.s. | |

The hypothesis is not supported either for males or females.

Reported Consultation: Comparison was made between the students who, having reported physical illness, claimed to have Consulted or Not Consulted a doctor for it.

Table 96 shows the distribution. Because of the small numbers in some of the cells, Failures and Drop-outs were combined when carrying out the chi square test.

TABLE 96

REPORTED CONSULTATION FOR PHYSICAL ILLNESS AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | Consulted (208) | Not Consulted (89) | Consulted (235) | Not Consulted (98) |
| Very Successful | 16% | 21% | 11% | 15% |
| Moderately Successful | 59% | 55% | 63% | 66% |
| Failures | 21% | 20% | 21% | 16% |
| Drop-outs | 4% | 3% | 4% | 3% |
| | $X^2$=1.29, d.f.=2, n.s. | | $X^2$=2.25, d.f.=2, n.s. | |

The hypothesis (b) is not supported either for males or for females.

2. Emotional Disturbance

Students were asked if they had been Emotionally or Nervously unwell since coming to University and if they had consulted a doctor for this.

Hypothesis: (a) Reported Emotional Disturbance is related to academic performance.

(b) Reported consultation for Emotional Disturbance is related to academic performance.

Reported Emotional Disturbance: Those reporting Emotional Disturbance were compared with those who did not report any. Table 97 shows the distribution.

TABLE 97

REPORTED EMOTIONAL DISTURBANCE AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | No Emotional Disturbance (786) | Reported Emotional Disturbance (132) | No Emotional Disturbance (571) | Reported Emotional Disturbance (137) |
| Very Successful | 17% | 13% | 14% | 16% |
| Moderately Successful | 64% | 53% | 66% | 60% |
| Failures | 16% | 26% | 16% | 20% |
| Drop-outs | 3% | 8% | 3% | 4% |
| | $\chi^2$=17.79, d.f.=3, p<.001 | | $\chi^2$=2.16, d.f.=3, n.s. | |

The differences are very significant in the case of males but not significant in the case of females.

The hypothesis is proved for males but not for females.

To find out where exactly the difference lay, and to get some more information from the data, partitioning of chi squares was carried out. The results were as follows:-

Males

| Component of chi square due to: | Chi Square | d.f. | Significance Level |
|---|---|---|---|
| 1. Difference between Very Successful and Moderately Successful | .042 | 1 | n.s. |
| 2. Difference between Failures and Drop-outs | 2.38 | 1 | n.s. |
| 3. Difference between All Successful and All Unsuccessful | 15.36 | 1 | <.001 |

The results show that Very Successful students do not differ significantly from Moderately Successful students. The difference between Failures and Drop-outs is also not significant. The main contribution to the overall chi square value comes from the difference between All Successful students and All Unsuccessful students.

Females

| Component of chi square due to: | Chi Square | d.f. | Significance Level |
|---|---|---|---|
| 1. Difference between Very Successful and Moderately Successful | .654 | 1 | n.s. |
| 2. Difference between Failures and Drop-outs | .028 | 1 | n.s. |
| 3. Difference between All Successful and All Unsuccessful | 1.48 | 1 | n.s. |

In the case of females, therefore, none of the comparisons show a significant difference. Reporting of emotional disturbance is not related to academic performance.

Reported Consultation: Comparison was made between students who, having reported emotional disturbance, claimed to have Consulted or Not Consulted a doctor for it.

Table 98 shows the distribution. Because of small numbers in some cells a chi square test was carried out after combining Very Successful with Moderately Successful and the Failures with the Drop-outs.

TABLE 98

REPORTED CONSULTATION FOR EMOTIONAL DISTURBANCE AND ACADEMIC PERFORMANCE

| | Males | | Females | |
|---|---|---|---|---|
| | Consulted (29) | Not Consulted (102) | Consulted (43) | Not Consulted (91) |
| Very Successful | 7% | 14% | 9% | 20% |
| Moderately Successful | 52% | 55% | 65% | 56% |
| Failures | 24% | 26% | 21% | 21% |
| Drop-outs | 17% | 5% | 5% | 3% |
| | $\chi^2$=1.01, d.f.=1, n.s. | | $\chi^2$=.031, d.f.=1, n.s. | |

Chi square test shows no statistical difference, either in the case of males or females.

The hypothesis is not supported either for males or for females.

Examination of percentages shows that 17% of the males who report consultation Drop-out compared to 5% of those who report emotional disturbance but do not report to have consulted for this. The percentages are, however, worked out from a very small number in this group and should be interpreted with caution.

Chapter 10

## PREPARATION AND VALIDATION OF PREDICTION SCALES

The main aim of the study was to make a combined use of the various items found to have a significant relationship with outcome and to see if this increased the chances of finding out in advance those at risk of Failing or Dropping out.

Besides those in the first questionnaire, a number of items in the second questionnaire had been found to have a significant association with the academic performance. Inclusion of these items in an index of prediction would, in all likelihood, have increased the power of prediction. However, since the second questionnaire was given out only two to three months before the examination, it would have defeated the very purpose for which the instrument was to be prepared, that is to seek out those at risk and give them appropriate help or guidance as early in their career as possible. Therefore, the items from the first questionnaire only were used for preparing a prediction scale.

Two different methods were adopted to construct such a prediction scale:-

(a) Multiple regression. The index of prediction prepared by this method is referred to as the 'Multiple regression scale'.

(b) Arbitrary weighting of the items found to have a statistically significant relation with academic performance. The index of prediction prepared by this method is referred to as the 'Simple prediction scale'.

This section deals with the results obtained when the two methods were used.

1. Multiple Regression Scale

Some technical problems had to be overcome before Multiple Regression could be carried out. The computer programme used in this study was written in such a fashion as to reject the whole card if one or more of the columns were coded 'not known' or 'not applicable'. In practice this would have meant complete loss of information on the student who had a missing value, even on one variable. Rather than reduce the total sample under consideration and thus possibly create a bias, it was decided to exclude from consideration those variables likely to have a large number of students with missing values*. An exception was made, however, with respect to the variable "Father's occupation" as the information was considered too valuable to be lost. A compromise had to be made; all the students with missing values on this variable were assigned to Social Class III.

In all, twenty-six variables were taken into consideration. As explained in the section on method (page 78 ) Multiple Regression was carried out with only four fifths of the total sample. One fifth of the sample was kept in reserve to 'validate' the results obtained from the analysis. The Multiple Regression was carried out separately for males and females.

---

* e.g. "Father's attitude towards the student coming to University". A number of students had lost their father and, naturally, scored 'not applicable' in their questionnaire.

The twenty-six item scale is given in Appendix E

The first step in discovering the value of this scale was to test the following two hypotheses:-

(1) The contribution made by the twenty-six regression variables towards total variance is greater than zero.

(2) This contribution becomes greater if 'Faculty' is added on as an additional independent variable.

These hypotheses were tested separately for males and females. Tables 99 and 100 show the results for the first hypothesis.

TABLE 99

Males

| | | d.f. | Mean square | F ratio |
|---|---|---|---|---|
| $R^2$ due to regression | 14.4952 | 25 | .5798 | 3.5967 |
| $R^2$ residual | 132.3809 | 821 | .16124 | |

$p<.001$

TABLE 100

Females

| | | d.f. | Mean square | F ratio |
|---|---|---|---|---|
| $R^2$ due to regression | 11.3778 | 25 | .4550 | 2.789 |
| $R^2$ residual | 98.717 | 605 | .16316 | |

$p<.001$

The hypothesis is supported both for males and females.

Tables 101 and 102 show the results when the second hypothesis was tested.

TABLE 101

Males

| | | d.f. | Mean square | F ratio |
|---|---|---|---|---|
| $R^2$ due to 'Faculty' | 8.007 | 5 | 1.6154 | 10.593 |
| $R^2$ residual | 124.303 | 815 | .1525 | |

$p<.001$

TABLE 102

Females

| | | d.f. | Mean square | F ratio |
|---|---|---|---|---|
| $R^2$ due to 'Faculty' | 2.8369 | 5 | .5674 | 3.54 |
| $R^2$ residual | 95.88 | 509 | .1600 | |

$p<.001$

The second hypothesis is proved for both males and females.

Caution must be exercised in interpreting the results with respect to the second hypothesis. The results only mean that the addition of Faculty as an independent variable will improve the prediction, provided the other variables are those which have been used in this regression equation. It in no way reflects the actual contribution of Faculty towards student wastage.

Multiple regression only helps in choosing an efficient combination of predictors. This problem is quite different from the theoretical problem of determining the actual importance of a variable in a particular field. The latter problem, as Hope (1968) says, "..... is insoluble by computational methods alone".

The next step was to examine the predictive power of the scale. Each variable carried a weight with a plus or minus prefix. The sign 'plus' meant that the variable had a positive relation with the criterion 'success' and vice-versa. Each student was then assigned a 'value' by multiplying the raw score on a particular variable with the appropriate weight. These 'values' were then added up for each student and the total for each student was called the Expected Value for that student. A high Expected Value meant a greater chance of success and vice-versa.

The range of Expected Value was found to be between .39 to 1.12, both for males and females. The students were divided into seven classes; Class I included the students with score 1 or above, Class II with a score between .9 and .99 and so on, till Class VII which had students with scores of .49 or less. Each class was then examined for the proportion of students who were actually Unsuccessful.

The results are given in Tables 103 and 104.

TABLE 103

Males

| Class | Score | Number of Students | Percentage Unsuccessful |
|---|---|---|---|
| I | 1 or more | 74 | 0% |
| II | .9 - .99 | 120 | 6% |
| III | .8 - .89 | 189 | 15% |
| IV | .7 - .79 | 206 | 19% |
| V | .6 - .69 | 153 | 37% |
| VI | .5 - .59 | 72 | 54% |
| VII | .49 or less | 31 | 55% |

TABLE 104

Females

| Class | Score | Number of Students | Percentage Unsuccessful |
|---|---|---|---|
| I | 1 or more | 39 | 5% |
| II | .9 - .99 | 93 | 5% |
| III | .8 - .89 | 148 | 14% |
| IV | .7 - .79 | 174 | 21% |
| V | .6 - .69 | 100 | 33% |
| VI | .5 - .59 | 54 | 44% |
| VII | .49 or less | 23 | 70% |

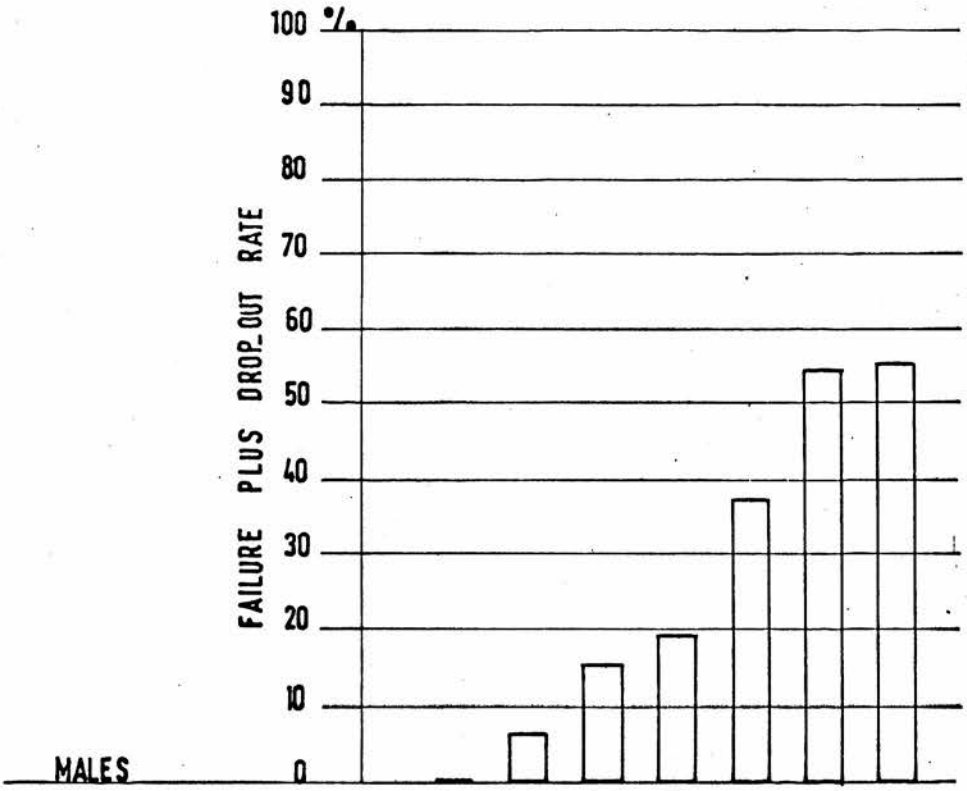



FIGURE 8

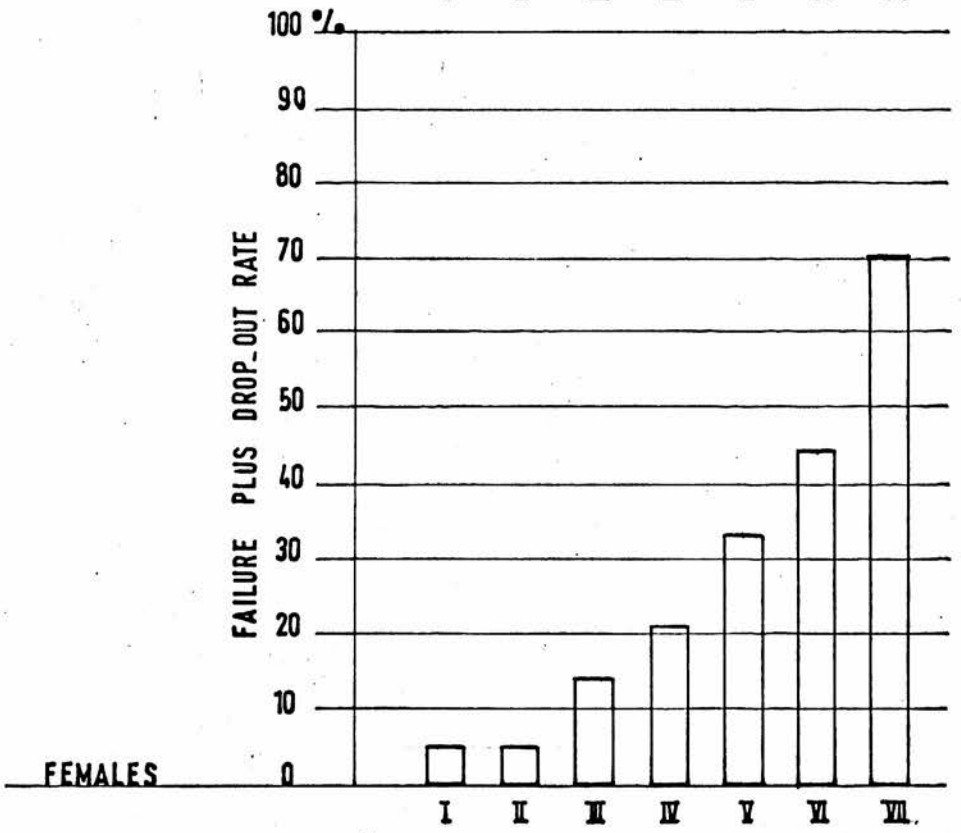



FIGURE 9

CLASSES ON MULTIPLE REGRESSION SCALE

As shown before, 21% of males and 22% of females were Unsuccessful in the total population. In other words, a student picked at random had 21 chances out of 100 of being Unsuccessful.

If the prediction scale is used the male student who gets a score of 1 or more has a 100% chance of Success. The chance of being Unsuccessful is still quite small if his score is between .9 to .99. The chances of being Unsuccessful go on increasing as one goes down the scale, and is more than 50% if he scores below .5. The females show a similar trend with the chance of being Unsuccessful being 5% only when the score is .9 or more and more than 50% when the score is .49 or less.

Figures 8 & 9 illustrate the findings.

These results are, of course, biased since they are based on the same sample as that from which the scale was constructed. To test the validity of the scale, it was applied to the rest of the total cohort, that is the one fifth of males and females respectively who were excluded from the multiple regression analysis.

Table 105 compares the results in the four fifths sample with those which were obtained when the one fifth sample was tested.

TABLE 105

| Class | Males | | Females | |
|---|---|---|---|---|
| | 4/5th sample Unsuccessful | 1/5th sample Unsuccessful | 4/5th sample Unsuccessful | 1/5th sample Unsuccessful |
| I | 0% | 0% | 5% | 6% |
| II | 6% | 8% | 5% | 8% |
| III | 15% | 13% | 14% | 13% |
| IV | 19% | 23% | 21% | 25% |
| V | 37% | 27% | 33% | 30% |
| VI | 54% | 46% | 44% | 50% |
| VII | 55% | | 70% | |

The table shows that the bias is very small. The percentage of Unsuccessful students in each class is very similar in the 4/5th and 1/5th samples. If due allowance is given for the fact that when regression weights are applied to fresh data, the value of the correlation between predicted and actual criterion score always shows a drop (Hope, 1968), this prediction scale seems to be working as well for the one fifth as it did for the four fifth sample. The scale therefore seems to have been validated.

Another problem to be considered with a prediction scale is the problem of misclassification. It is important to find out how many students would be misclassified if a particular cut-off point on the scale is used to separate those at risk and those not at risk of being Unsuccessful.

Tables 106 and 107 give an estimate of misclassification. Having found the scale to be validated, the four fifths and the one fifth sample were combined for this exercise. The tables show the various classes (on expected value), the absolute numbers of Successful and Unsuccessful students in each class and the percentages, which add up vertically.

TABLE 106

Males

| Class | Score | Successful | Unsuccessful |
|---|---|---|---|
| I | 1 or more | 90 (11%) | 0 ( 0%) |
| II | .9 - .99 | 137 (17%) | 9 ( 4%) |
| III | .8 - .89 | 199 (24%) | 35 (16%) |
| IV | .7 - .79 | 216 (26%) | 54 (24%) |
| V | .6 - .69 | 124 (15%) | 66 (29%) |
| VI | .5 - .59 | 38 ( 5%) | 44 (20%) |
| VII | .49 or less | 15 ( 2%) | 17 ( 7%) |
| Total | | 819 (100%) | 225 (100%) |

TABLE 107

Females

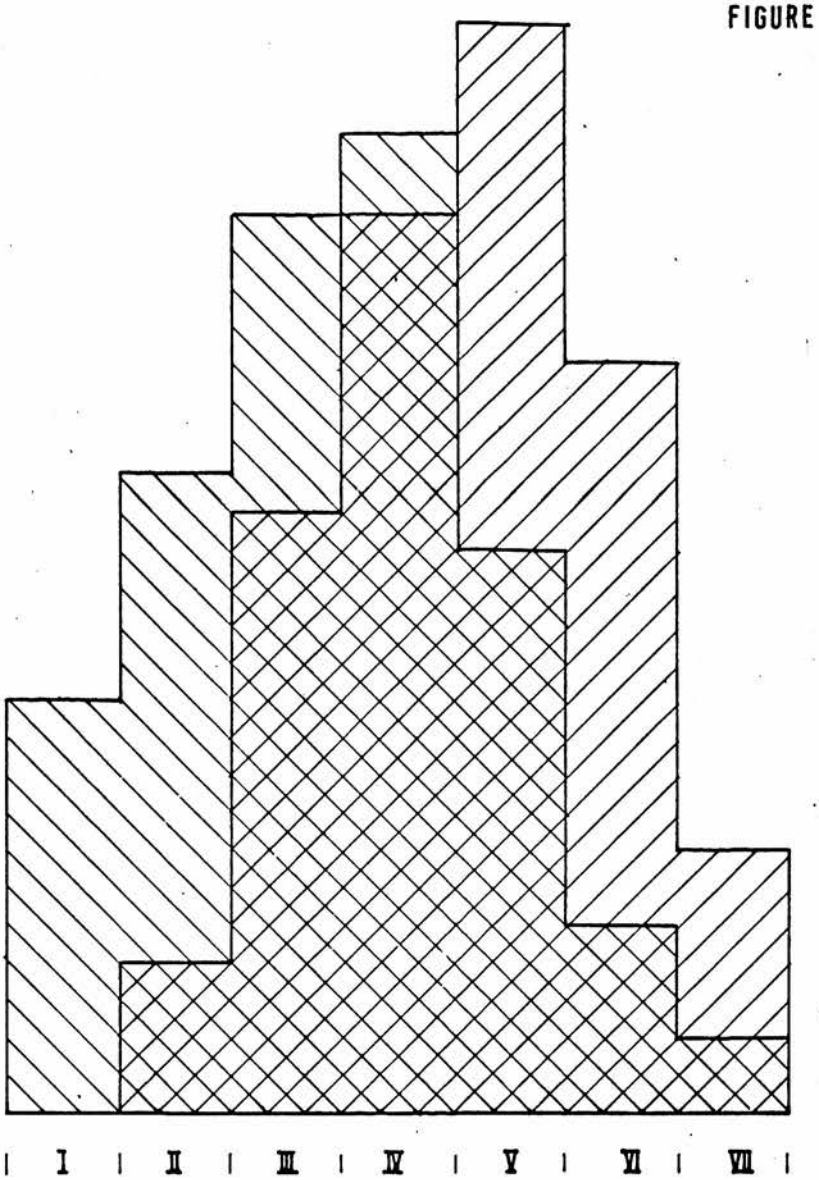
| Class | Score | Successful | | Unsuccessful | |
|---|---|---|---|---|---|
| I | 1 or more | 54 | ( 9%) | 3 | ( 2%) |
| II | .9 - .99 | 100 | (16%) | 6 | ( 4%) |
| III | .8 - .89 | 161 | (26%) | 26 | (15%) |
| IV | .7 - .79 | 181 | (29%) | 52 | (30%) |
| V | .6 - .69 | 83 | (13%) | 40 | (23%) |
| VI | .5 - .59 | 38 | ( 6%) | 28 | (16%) |
| VII | .49 or less | 9 | ( 1%) | 18 | (10%) |
| Total | | 626 | (100%) | 173 | (100%) |

A perfect classification would mean that below a particular score everyone is Unsuccessful and above it everyone is Successful. Such a perfect classification is almost impossible in a practical situation.

In Table 106 if a cut-off is made between Class VI and Class VII and all students with a score of .49 or less are assumed to be Unsuccessful, 7% of the Unsuccessful will be correctly classified but at the cost of misclassifying the 2% of Successful students who happen to fall in Class VII.

If the cut-off is made between Class IV and Class V and all students with a score of .69 or less assumed to be Unsuccessful, 56% of the actually Unsuccessful students will be correctly classified (29% + 20% + 7%) but at the cost of misclassifying 22% of Successful students (15% + 5% + 2%).

FIGURE 10



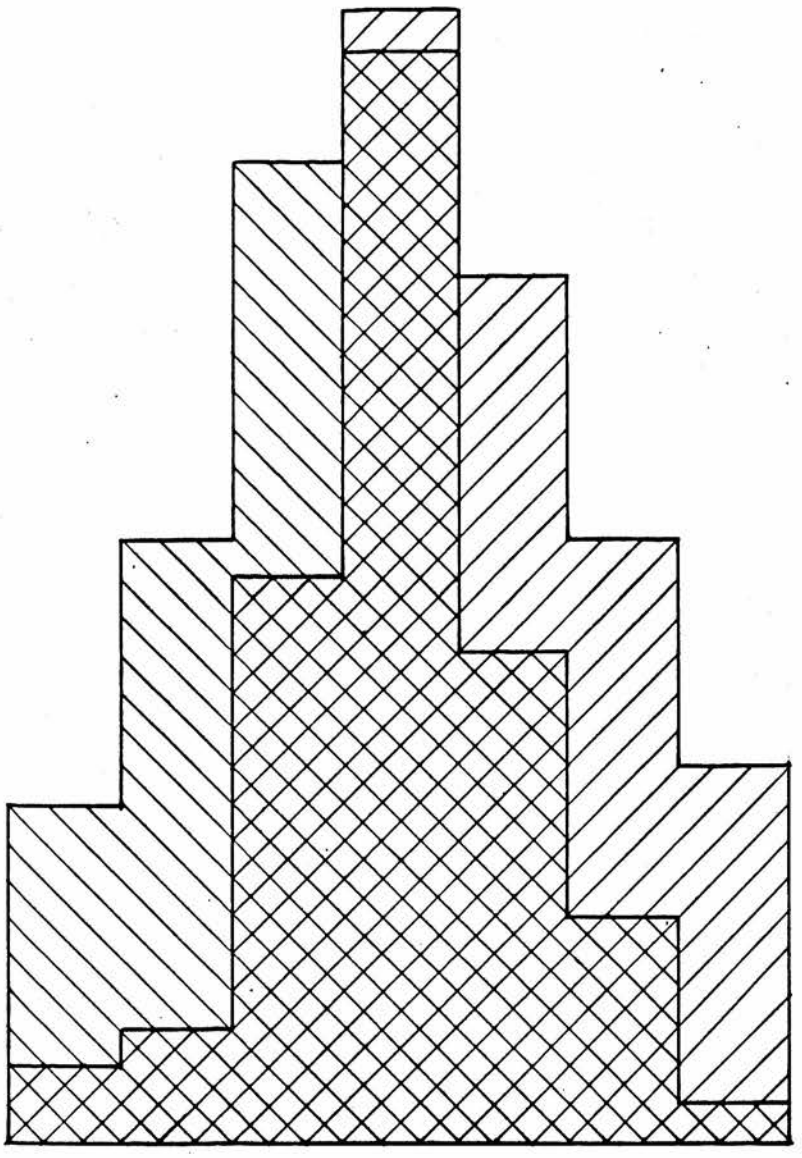

SUCCESSFUL

UNSUCCESSFUL

MALES

OVERLAP BETWEEN SUCCESSFUL AND UNSUCCESSFUL STUDENTS

FIGURE 11




SUCCESSFUL

UNSUCCESSFUL

FEMALES

OVERLAP BETWEEN SUCCESSFUL AND UNSUCCESSFUL STUDENTS

Table 107 gives the results for females. If a cut-off is made between Classes IV and V and all students with a score of .69 or below assumed to be Unsuccessful, 49% of the Unsuccessful students will be correctly classified but at the cost of misclassifying 20% of Successful students. Obviously there is a great overlap and this is clearly shown in the histograms (Figure 10 and Figure 11 ). However, the histograms also show that the performance of a number of students at either end can be predicted with confidence.

2. Simple Prediction Scale

This method entailed the following steps:-

(a) Isolation of the factors found to have a statistically significant assocation with outcome.

(b) A crude check on degree of association by examining the 4 x n contingency tables showing percentages.

(c) Assignment to each student of a score from 0 to 2, depending on where he falls on the range. For example, it was found that English male students do better than Scottish who in turn do better than Foreign students. English students were given a score of 0, Scottish students a score of 1, and Foreign students a score of 2.

A score of 1 was given only when absolutely necessary, as in the above mentioned case. In most cases, computation was kept simple by assigning a score of 0 or 2 only.

Separate scales were constructed for males and females (as the nature and degree of association between some of the variables and the criterion differed in males and females). The scales are given in Appendix **F**

Twelve variables were considered for males and 13 for females. The males, therefore, could score from 0 to 24 and the females from 0 to 26. In fact, the males scored from 4 to 19 and the females scored from 1 to 16.

Males were divided into seven classes. The score range for each class and the proportion of Unsuccessful students in each is shown in the following table. (See also Figure 12).

TABLE 108

| Class | Score | Total | Percentage Unsuccessful |
|---|---|---|---|
| I | 17 or more | 37 | 3% |
| II | 15 - 16 | 114 | 5% |
| III | 13 - 14 | 249 | 11% |
| IV | 11 - 12 | 296 | 21% |
| V | 9 - 10 | 108 | 29% |
| VI | 7 - 8 | 114 | 44% |
| VII | 6 or less | 37 | 59% |

The chances of being Unsuccessful are less than 3 in 100 if the student scores more than 17 and they increase with every class till in Class VII, i.e. with a score of 6 or less, the chances of Failing or Dropping out shoot up to 59 in 100.

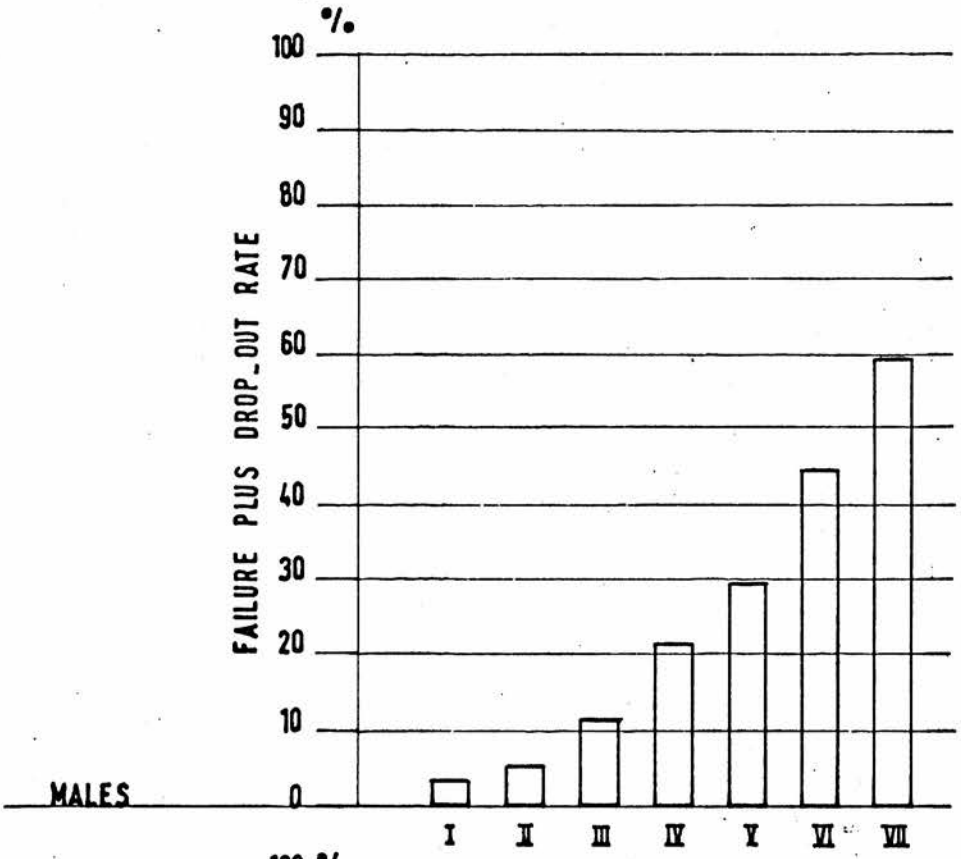



FIGURE 12

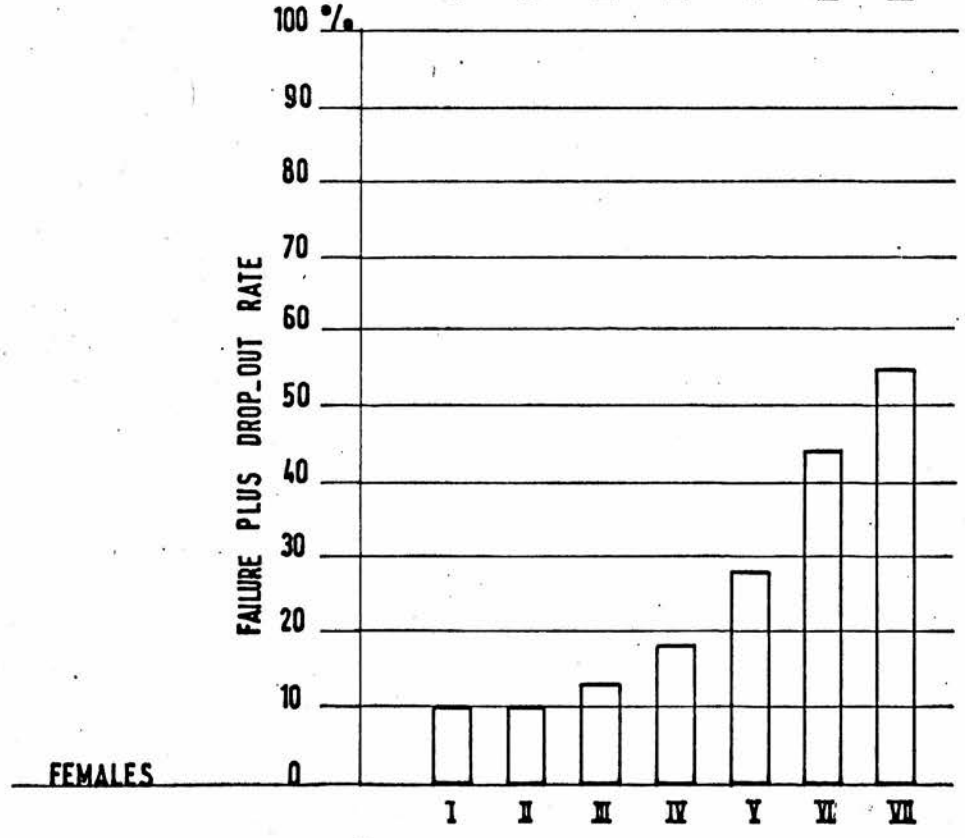



FIGURE 13

CLASSES ON SIMPLE PREDICTION SCALE

Females were also divided into seven classes. Table 109 shows the results for females. (See also Figure 13).

TABLE 109

| Class | Score | Total | Percentage Unsuccessful |
|---|---|---|---|
| I | 13 or more | 35 | 10% |
| II | 11 - 12 | 110 | 10% |
| III | 9 - 10 | 170 | 13% |
| IV | 7 - 8 | 195 | 18% |
| V | 5 - 6 | 166 | 28% |
| VI | 3 - 4 | 92 | 44% |
| VII | 2 or less | 37 | 55% |

At a score of 13 or more the chances of being Unsuccessful are 10 in 100 and rise until a score of 2 or less when they are 55 in 100.

Tables 110 and 111 indicate misclassification and show the percentage of Very Successful, Moderately Successful, Failures and Drop-outs falling into each class.

TABLE 110

Males

| Class | Score | Very Successful (172) | Moderately Successful (654) | Failures (188) | Drop-Outs (41) |
|---|---|---|---|---|---|
| I | 17 or more | 10% | 2% | 0% | 2% |
| II | 15 - 16 | 17% | 12% | 4% | 0% |
| III | 13 - 14 | 27% | 28% | 14% | 5% |
| IV | 11 - 12 | 28% | 28% | 28% | 23% |
| V | 9 - 10 | 13% | 20% | 27% | 20% |
| VI | 7 - 8 | 5% | 8% | 20% | 29% |
| VII | 6 or less | 0% | 2% | 7% | 21% |

In the case of males if a cut-off is made between Class VI and Class VII and every one with score 6 or less is assumed to be Unsuccessful, 21% of Drop-outs and 7% of Failures are correctly classified but 2% of Moderately Successful are misclassified. No Very Successful males are misclassified. If a cut-off is made between Class IV and Class V and all students with score 9 or less assumed to be Unsuccessful, 70% of Drop-outs and 54% of Failures are correctly classified but at the cost of misclassifying 30% of Moderately Successful students and 18% of Very Successful students.

TABLE 111

Females

| Class | Score | Very Successful (114) | Moderately Successful (514) | Failures (134) | Drop-Outs (43) |
|---|---|---|---|---|---|
| I | 13 or more | 29% | 18% | 6% | 9% |
| II | 11 - 12 | 27% | 22% | 13% | 12% |
| III | 9 - 10 | 25% | 26% | 20% | 20% |
| IV | 7 - 8 | 13% | 21% | 28% | 19% |
| V | 5 - 6 | 5% | 10% | 21% | 31% |
| VI | 3 - 4 | 1% | 3% | 8% | 7% |
| VII | 2 or less | 0% | 0% | 4% | 2% |

For females if a cut-off is made between Class IV and Class V and all students scoring 6 or less are assumed to be Unsuccessful, 40% of Drop-outs and 33% of Failures are correctly classified but at the cost of misclassifying 13% of Moderately Successful and 6% of Very Successful students. If the cut-off is made between Class III and Class IV and all students with score

8 or less assumed to be Unsuccessful, 59% of Drop-outs and 61% of Failures are correctly classified while 34% of Moderately Successful and 19% of Very Successful students are misclassified.

This scale seems to work better for males than for females. The scale is compared with and evaluated against the Multiple Regression scale in the chapter on Discussion.

# DISCUSSION

Chapter 11

# DISCUSSION OF THE RESEARCH DESIGN

The general approach:

The main aim of the study was to predict those at risk of failing or dropping out as accurately as possible. A review of the literature had demonstrated that there was no single, main cause of the student wastage; an intensive study into any one area would not, therefore, have helped in achieving the aim. A comprehensive approach was adopted accordingly.

The study was prospective in design. It seemed likely that a retrospective inquiry might have a negative influence on the answers of the failed students to such questions as: "What was your attitude towards coming to University?" and "Were you happy with the choice of course?". Other workers, (Marsh 1966) have raised doubts about retrospective studies in this area and Knoell (1966) goes so far as recommending a moratorium on these "Autopsy" studies.

As the study was prospective, there was no way of foretelling who was going to fail or drop-out. It was necessary, therefore, to take a sample large enough to ensure that each criterion group would include a sufficient number of students for meaningful analysis. This was achieved by taking the total First Year Student cohort. Post graduates, non graduates and diploma students were excluded as their results could in no way be compared to those of the undergraduates. 'Transfers' from other courses and the 'First degree repeaters' were

excluded because they had a much longer experience of the University environment and therefore, in the terms of items in the second questionnaire were not comparable to those coming for the first time.

The questionnaires:

Because of the wide field covered by the study and the large number of students in the cohort, there was no choice but to use a questionnaire approach, in spite of its inherent limitations. To gain the full co-operation of the student it was necessary that questionnaires should be brief. This, in practice, meant exclusion of some relevant items, an important omission being a 'measure of intelligence'. The only I.Q. test known to discriminate well in the higher ranges of I.Q., is $AH_5$ (Heim 1956) and it takes 40 minutes to complete. However, as the concept of a 'G' factor is itself in doubt, exclusion of an I.Q. test was not considered a major sacrifice.

The procedure for computing the School Achievement Score, needs an explanation. Though there was a good reason to believe that G.C.E. standards were higher than those for S.C.E. examination, there was no evidence which supported any particular relative weighting of 'A' level grades and the Scottish 'Highers' grades. The decision of giving five points for 'A' level A grade and three points for 'Higher' A grade was purely arbitrary. The fact that one faculty in Edinburgh University (Private communication) was already experimenting with such a procedure may be taken as a partial justification.

The desirability of having an objective assessment of the emotional disturbance at the time of entry, has been stressed before. The problem was to choose an instrument which could be accommodated in a questionnaire which took not more than fifteen minutes to complete. The Personal Disturbance Scale (Foulds and Hope, 1968) was chosen because it could be completed in about two minutes. The fact that the scale had not been standardised in the student population did not seem to matter, since the aim was to make a within group comparison; and to see if the scores on this scale could, on a purely empirical basis, be related to academic performance.

Similar justification may be offered for the question, "Have you been nervously or emotionally unwell?" in the second questionnaire. The presence of psychiatric illness could not be deduced from a positive answer to this question. On the other hand consultation alone would have been too limited an indication of the emotional problems of the students. Kidd (1963) had found this question very useful in assessing the student's own perception of their mental health, and his example was followed. Again, the aim was to see if on a purely empirical basis reported emotional disturbance could be related to academic performance.

It may be argued that for the next question, "..... did you consult a doctor", some students would deliberately hide the information. However, Kidd (1963) discovered that it would be true only for a small proportion of the students. He went on to say ....., that an effective and simple method of gathering morbidity data on students who

consult with psychiatric disorders is to ask the students themselves." Further, because of the wide scope of the study, it seemed impractical to obtain the 'actual consultation' figures from the doctors concerned and 'declared consultation' was accepted as an alternative.

It has been shown that an investigation of the relationship between 'Hostility' and academic performance, might produce dividends. (Roth and Puri 1967; Rose and Elton 1967). This variable was, therefore, taken into consideration; but in preference to Rosenzwieg's test, (a projective test used by the previous workers), Hostility and Direction of Hostility Questionnaire was employed, the latter being an objective test with a satisfactory reliability. (Caine et al 1967).

Classification of academic performance:

Each classification serves some particular purpose. The classification adopted by the faculty offices serves the purpose of showing the actual number of students who leave the University.

However, what is required for research, is a clear definition and a uniform application of the criteria on which the classification is based. The classification used in this study and described fully in the section on method, attempts to fulfil this aim. One major step taken towards this ideal, was the standardisation of marks, which helped in increasing the comparability of marks in the 'strict' and the 'lenient' subjects. The classification still fell short of the ideal because of unreliability of examination procedures. Nothing short of a revolution in examination procedures will solve that problem.

Prediction:

A number of methods were considered before accepting multiple regression as a method of choice for constructing the prediction scale.

One alternative was to use the classification procedure based on Bayes' theorem and decision theory (Birnbaum and Maxwell 1961). This method did not have any restrictive theoretical assumptions but suffered from one distinct disadvantage: "As the number of variables increases, the number of possible answer patterns increases exponentially". (Maxwell 1967). The present study took into consideration a large number of variables and, therefore, would have required a huge sample to enable an optimal grouping of the variables.

The classification procedure developed by MacNaughton-Smith (1963) was also considered. Besides being a very simple procedure, it has the great advantage that it takes into account the interaction between various variables which a multiple regression does not. The method, however, also suffers from the disadvantage, that for consideration of a large number of variables, a very large sample is required.

Multiple regression assumes: (a) linearity and (b) additivity of the variables. The data in the present study was not expected to fulfil either of these assumptions. The usefulness of the multiple regression procedure under less than optimal conditions has, however, been demonstrated by other workers. Mannheim and Wilkins (1955) have used the method with advantage in the field of criminology and with a data which did not fulfil either of the assumptions. The

robustness of their instrument was demonstrated in a subsequent 'prospective validation' procedure. In this study, therefore, it was decided to use multiple regression in spite of its limitations.

Spindt (1960) reviews 25 years of research on predictive methods in the field of higher education. The most striking feature of the review is that in none of the studies mentioned was a validation procedure carried out. A prediction scale developed from a particular sample may not show the same power of prediction when used with a fresh sample. The poor reliability of the instruments with which the predictors are measured can be a major cause of such a discrepancy. To examine whether the power of a prediction scale remains constant over different samples or not, a validation procedure is necessary. In this study a cross validation was carried out as a prospective validation would have meant waiting for the next year's cohort.

The technique by which the cross validation was carried out has already been described. The practical need for a Simple Prediction Scale and the details of this self devised procedure have also been given before.

Epidemiological nature of the inquiry: The basic aim and strategy in medical epidemiology is to reach some estimate of the 'cases' occurring in a defined population, while a clinical approach means dealing only with the 'cases' (Morris 1964). In the present study instead of concentrating only on the 'cases', who in this instance were the Failures and Drop-outs, an attempt was made to study these 'cases' in the context of the total First Year Student population, and in this sense, the 'model' employed in this study was 'epidemiological'.

# Chapter 12

## IMPLICATIONS OF THE RESULTS

### The Response to the Questionnaires

99% of the students responded to the first questionnaire administered in the presence of the investigator and 91% of the students responded to the second questionnaire sent by post. It is not unusual to get a satisfactory response from a young and intelligent population such as the students constitute. The following additional factors may also have contributed to a good response:

1. The brevity of the two questionnaires.
2. A carefully designed introduction to the two questionnaires, based on concrete suggestions by Goode and Hatt (1952).
3. A series of quick reminders to the non responders, each time with a new schedule and a stamped addressed envelope.
4. The co-operation from the postal authorities who acceded to the request of returning promptly every undelivered questionnaire.

The non responders on the second questionnaire were identified and their response to certain items on the first questionnaire was compared with that of the total cohort. The non responders were broadly similar to the total cohort and their omission did not seem to bias the remainder of the sample. ( Appendix A).

Description of the Cohort

A preliminary description of the cohort was carried out only to provide a context against which the other results could be examined. A critical examination of the characteristics of Edinburgh University Students was not, however, one of the main aims of this study and no further discussion of these characteristics is carried out in this section.

Factors Related to Academic Performance

Any interpretation of the results in this study should be made in the light of the following comments:-

1. It cannot be overstressed that a statistically significant relation of a factor with the criterion does not necessarily mean that the former is the 'cause' of the latter. However, since in this study the assessment of the various factors preceded the degree examination, the factors found to have a statistically significant association with the academic performance may be considered as 'predictors' whatever that may mean in terms of cause and effect.

2. The author has previously emphasised the lack of a common definition of the student wastage and hence the non comparability of the findings in different studies. For the same reason the findings in this study are not strictly comparable to those in the previous inquiries. It is hoped, however, that an attempt made in this investigation to

establish generally applicable criteria of academic performance and to increase the comparability of marking in different subjects by standardising the marks, will perhaps be useful in future work in this field.

3. The design of this study permitted only a superficial examination of the various factors. The 'explanations' offered in the subsequent pages to account for the various findings must, therefore, be taken only as hypotheses which must be confirmed through more intensive inquiries in the different areas.

The Predictors in the First Questionnaire

School Achievement Score (S.A.S.) : An overall, statistically significant difference is found in the mean S.A.S. for the four categories of academic performance and as expected, the Very Successful have the highest mean S.A.S., while the Failures have the lowest mean S.A.S.

An examination of the Table 60 shows that if the four categories are arranged according to their mean scores, the difference in the Very Successful group and its immediate neighbour the Moderately Successful group is larger than that between the Moderately Successful and the Drop-outs, or that between Drop-outs and Failures. This is further confirmed by the Scheffe's test for multiple comparisons, the F ratio for the comparison between the Very Successful and Moderately Successful being much higher than that between the other categories. (page 143).

The practical implications of this analysis are clear. The selection procedures which are heavily dependent on school examination grades, successfully select out the students who will have outstanding University careers. They are, however, much less successful in discriminating between the average student and an unsuccessful student and this perhaps should be their most important function.

Type of Certificate : The students with G.C.E. fare much better than those with S.C.E. This confirms the findings of Craig and Duff (1961). In theory, one or more of the following measures may help to overcome this discrepancy:

1. The S.C.E. standards may be raised.
2. The First Degree examination standards may be lowered.
3. The S.C.E. students may be given special intensive coaching during the first year.
4. The other faculties may follow the example of the Medical faculty in giving the students with high qualifications a direct admission to second year.

Age : The results show that the under 20's do better than the over 20's. This is in keeping with the findings of Barnett et al (1968). The poorer performance of the older age students may be due to one of the following reasons:

1. The 'older' students are those who have taken longer at gaining sufficient entrance requirements (presumably because of lower potential ability).

2. The 'mature' students are given special consideration on admission and some are taken in spite of lower grades.

3. The older students are those who have been doing other jobs after school and have lost touch with the subjects or the study habits.

It is possible that for the students who are unsuccessful for the third reason mentioned above, a little longer 'grace' period may bring back the necessary familiarity with the subjects or study habits. One may suggest that these students should be shown a special consideration when a decision to discontinue them after the first year failure is being discussed.

Nationality :

1. Scottish students show worse performance than the 'Other British' students (Table 40). This difference has generally been explained on the grounds that most Scottish students come with S.C.E. and being younger, are rather 'immature'. In this study, 17 year old students show no worse a performance than the 18 or 19 year old students. To test the validity of the first assumption a comparison was made on nationality for only those students who came with G.C.E.* As

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* Some Scottish schools prepare the students for G.C.E.

Table 59 shows, the difference in the academic performance of the Scottish females and other British females is still statistically significant. For males, though the difference is not statistically significant, a trend towards the Scottish students doing less well is still maintained.

It will be naive to draw the conclusion that the Scots have a lower potential ability. The fault perhaps lies with the Scottish schools, which, irrespective of whether they prepare the students for G.C.E. or S.C.E., fail to provide the kind of training which makes a student succeed at the University. A thorough comparison of a sample of English and Scottish schools will help to confirm or disprove this 'hypothesis'.

2. Foreign males do worse than British males while foreign females do as well as the British females. It may be noted, however, that the proportion of the unsuccessful foreign students is constituted mainly by Drop-outs, there being a 19% drop out in foreign males and 10% drop out in foreign females, compared with the average of 4% and 5% respectively for the total cohort. This is possibly due to the fact that a foreign student, if he does not like the country or if he feels homesick, leaves the University and goes home. A local student has no such choice!

What is more interesting is the finding that foreign students do not show a failure rate any higher than that shown by Scottish students; in fact, the foreign females have the lowest failure rate of all. (Table 40).

Religious Participation : Voluntary Drop-outs, both males and females have a much higher proportion of 'low participants' when compared to the other three groups, while Failures are similar to the Very Successful and the Moderately Successful students.

The most probable explanation is that 'dropping out' is an expression of non conformist attitudes and would relate highly with other non conformist attitudes, such as low participation in religious activities.

Social Background : Lower social class, manual occupation of the father and a lower educational achievement of the parents are all related to poor academic performance in females. All the three variables are certainly interrelated and one may interpret the findings to mean that they represent a culture which does not put a high premium on higher education. This interpretation cannot, however, not be fully supported, since for males none of the above mentioned factors show a statistically signification relation with academic performance.

There can be two explanations for this difference between males and females:-

1. The lower socio economic groups have a different attitude towards higher education for males and females. Higher education for the males is valued while that for the females is not, and the academic performance of the students reflects this attitude.

2. Males are more 'motivated' towards getting a degree and in this quest they are able to offset their cultural heritage while females 'give in' to the value orientation and attitudes of the culture they come from.

Another item in the questionnaire, i.e. the attitude of the father towards the student coming to University, helps to clarify the issue.

Though the proportion of fathers not in favour is the same for both males and females, an unfavourable attitude on the part of the father is related to a high drop out rate in the case of females, while no such relation is demonstrated for the males. This finding supports the second of the two explanations given above.

Other Motivational Factors : Students' own attitude towards coming to University is related very significantly to academic performance but once again, both for males and females, it is the drop-out rate and not the failure rate which is affected (Table 53 ).

The females who did not get admission to the course of their first choice do worse than the others. No such association exists for the males. Once again this may be explained on the grounds that the males are 'degree oriented' and accept a degree of any sort; the females come to the University because they are specially interested in some courses and their 'motivation' for success weakens if they are not admitted to the course of their choice. This hypothesis, however, needs to be tested.

It is difficult to interpret the relationship between high level of satisfaction with academic performance at school and the good performance at the University. High level of satisfaction may be just a reflection of high grades or it may be an indicator of a high degree of self confidence. In any case, the fact remains that this variable is a good predictor.

Psychological Factors : After partitioning the chi-square a statistically significant association between the Personal Disturbance Score (P.D. score) and the academic performance can be shown. The females who are not disturbed, (i.e. those with a score 0-1) show a better performance than the rest, (i.e. with the score 2+). On the other hand, the males who are not disturbed or who are moderately disturbed (i.e. with a score of 0-4) show a better performance than those who are disturbed, (i.e. with a score of 5+). It is not clear, however, why a different cut off point in the case of males and females respectively, acts as a discriminator. The only conclusion which may be drawn, is that a high P.D. score has a positive but a low level association with poor outcome.

There may be two reasons why P.D. score has not been found to have a strong association with academic performance:

1. It is well known that adolescents as a rule show a great emotional lability. It follows, therefore, that a young student may be 'disturbed' for a short phase and be perfectly normal afterwards. Any

measurement of 'emotional disturbance' at one point in time, as was attempted with the P.D. scale will pick out very transient phenomena, which are not necessarily related to performance in an examination held eight months later.

2. Emotional disturbance at the time of entry is related to future academic performance but the P.D. score is not an instrument sensitive enough to measure it.

It would be possible to test the validity of either hypothesis by detailed investigation of the emotional state at the time of entry on a sample of students.

Total Hostility or the Direction of Hostility as measured by Hostility and Direction of Hostility Questionnaire, (H.D.H.Q.) are not related to academic performance, either for males or for females. The findings of Roth and Puri (1967) and those of Rose and Elton (1967) are therefore not confirmed. The two subscales, Self Criticism score and Delusional Hostility score show a statistically significant association with academic performance in the case of the males only (Table 76). However, because of the fact that the overlap in the various categories is very large, it seems wiser not to make too much out of this finding.

Discussion of personal problems at home is significantly related to academic performance for males only. The students who claimed that the discussion of personal problems was difficult, in fact, show a better performance! It is difficult to interpret this finding.

Negative findings : Sex, marital status, civil status of the parents, birth order, mother's attitude towards the student coming to University, commitment to a future career, type of school, whether the fees were paid by the parents or not, whether the student was a boarder or a day pupil, size of the school, interest in clubs and societies at school, interests in sports at school and happiness at home did not show a significant association with academic performance for either males or females.

It is worth noting that the type of school has no relation with the academic performance at Edinburgh University. This is similar to the findings of Marris (1964) but is contrary to the findings of the Cambridge University Sociological Society (1961) who found that the grammar school students got proportionately twice as many firsts as the "H.M.C. independent school".

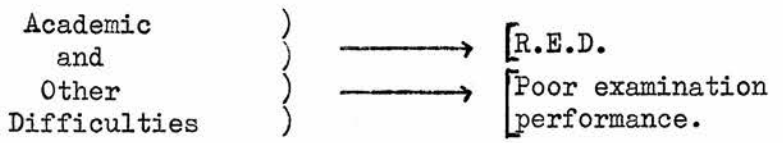
Predictors in the second questionnaire

'Reported emotional disturbance' (R.E.D.) has a very significant relation with poor academic performance for males but not for females. Two questions arise in relation to this finding:

1. Why is it that when the emotional disturbance, as measured by an objective instrument (P.D. scale) had a very low level relation with degree performance, emotional disturbance reported by the student six months later was found to have such a strong relationship with the latter?

The following explanations may be offered:-

(a) R.E.D. is a result of the academic and other difficulties the student faces at the University which are also directly related to poor academic performance. The relationship is probably as follows:




(b) Emotional disturbance does have a direct relation to poor performance, but, as mentioned before, investigation at one point in time may not be fruitful. R.E.D. represents a sum total of the student's emotional difficulties since coming to the University and is, therefore, a better indicator of the emotional disturbance.

2. Why is it that reported emotional disturbance is related to poor performance in males and not in females, in spite of the fact that the latter report proportionately more emotional disturbance?

It is difficult to answer this question. Perhaps the threshold for reporting emotional disturbance is very low in the case of the females and very minor difficulties (which do not interfere with their performance) lead to a reporting of the emotional disturbance.

There is nothing unexpected in the finding that dissatisfaction with University or with the course is related to poor performance. This dissatisfaction is probably a result of and not a cause of academic difficulties which lead to poor performance in the examination.

Poor interest in extracurricular activity: (sports for both males and females; clubs and societies for females only) is related to poor performance and this is in line with the findings of Solocum (1956), Lucas et al (1966) and Maclay (1968). It cannot be explained why a poor interest in clubs and societies is related to poor performance in females only.

Having many friends of the opposite sex is related to poor performance in the case of the males but does not seem to affect the females. However, having a special friend of the opposite sex interferes with academic performance for both males and females.

The females on grants only do worse than others. This again appears to be a reflection of the already demonstrated relationship between poor socio economic background and academic performance in the case of the females.

Negative Findings:

Residence, change of residence and satisfaction with residence had no relation to academic performance. Many students in Edinburgh University live in flats or digs. This does not seem to interfere with their academic performance in the first year. Number of friends ofthe same sex is not related to academic performance.

Poor contact with Director of Studies or with teaching staff is not related to failure or drop out. It is generally believed that a University set up where the students can have an easy access to and a free discussion with the staff is helpful to good scholarship. This assumption is not supported in this investigation. An alternative explanation may be that what is being measured by degree examinations, is not good scholarship but ability to memorise the lecture notes.

Failures and Drop-outs

Most British studies have not differentiated between Failures and Voluntary Drop-outs. An attempt made in this study to keep the two groups separate seems to have been rewarded. The following factors are specially related to drop-out and not to failure:-

1. Foreign nationality.
2. Low religious participation.
3. Unfavourable attitude towards coming to University.
4. Unfavourable attitude of the father for females.

Inter Faculty Differences in Academic Performance:

Tables 35 and 36 show that the failure and drop-out rates are the highest in the Law students and the lowest in the Medical students, both for male and female.

Tables 13 and 14 show that School Achievement Score (S.A.S.) of the Medical students is the highest and this may partially explain the good performance of this group. It is not, however, easy to account for the poor performance of the Law students. The following observations may be made :-

1. S.A.S. of the male Law students is the lowest, but the Social Science students who have only a marginally higher S.A.S. show an academic performance nearly as good as that of the Medical students. The female Law students have an S.A.S. higher than any but the Medical students and still show the poorest examination performance.

2. Type of certificate has been related to academic performance and the students with S.C.E. have been shown to have a worse performance than those with G.C.E. However, the students in the Social Science faculty, which in fact has the highest proportion of students with S.C.E., (Tables 16 and 17), show a much better performance than the Law students.

3. Poor socio economic background and low educational achievement of the parents have been shown to be related to poor performance in the case of females. The Law faculty shows the highest proportion of students from the upper social classes and those with graduate parents and these 'assets' should in fact have improved the performance of Law faculty females.

The results of multiple regression (Appendix E), clarifies the situation a little further. 'Faculty' when added to the regression equation as a new variable makes a statistically significant contribution to the total variance (page 190). This means that groups of students matched on other factors, would still show different failure and drop out rates depending upon the faculty they are in. Appendix E also shows that the regression coefficient for the Law faculty is not only prefixed with a minus sign but is also the highest of all the faculties, both for males and females. This means, that everything else being equal, being a Law student increases the chances of failing or dropping out; being a Medical student is an advantage, the regression coefficient being positive.

One needs to be very cautious in drawing definite conclusions from this finding. Hope (1968) discourages the workers from making any interpretation as to the actual significance of a regression coefficient, on the grounds that the contribution of a new variable is dependent on the variables already in the regression equation and may be quite different if this new variable is added to a different regression equation.

Bearing this in mind, the fact remains that the Law faculty does have the highest failure and drop-out rate and one is tempted to hypothesise that either: (a) the Law students differ from other students on some relevant variable or variables not considered in this investigation or (b) that the Law faculty has a high 'built in' wastage rate.

Appendix E shows that though the contribution towards the total variance is highest from the Law faculty, the Science faculty both for males and females and the Arts faculty for females only; also have a relatively high, negative regression coefficients when compared to the Medical and Social Science faculties.

To summarise, everything else being equal, the chances of being unsuccessful are highest if one is a: Law student, next highest if one is a Science student and next highest if one is an Arts student (females only).

The chances of being unsuccessful are the lowest if one is a Medical student.

The Prediction Scales

Tables 103, 104 and Figures 8 and 9 show that for the Multiple Regression Scale more than half of the students who score low, (Class VII), can be expected to fail or drop-out while for those who score high (Class I) the chances of being unsuccessful are almost negligible. This is a very satisfactory prediction, considering that if a student is selected at random, the chances of his or her being unsuccessful, are about 20 in 100.

Table 105 shows the satisfactory cross-validation of the Multiple Regression Scale. The scale prepared from the $^{4}/_{5}$th sample seems to predict as well for the rest ($^{1}/_{5}$th) of the sample.

Tables 108, 109 and Figures 12 and 13 show that the predictive power of the Simple Prediction Scale compares favourably with that of the Multiple Regression Scale. One must not, however, conclude from this that the multiple regression technique is without any merit; it must be remembered that in this study the technique was used under less than optimal conditions.

Whatever the reasons for similarity in the predictive power of the two scales, the Simple Prediction Scale seems to be an obvious choice for practical use. It uses much less information, most of which can be collected from the matriculation forms of the students; also it is much simpler to analyse. It is true that it has not been cross-validated the way the Multiple Regression Scale has been. However, the fact that the two scales predict equally well, may on

common sense grounds be taken as a proof of the validity of the Simple Prediction Scale. Further discussion in this section will be limited to the use of the Simple Prediction Scale only.

The results in Chapter 10 also show that though the prediction at the two ends of the scales is quite satisfactory, it is not so good in the middle categories. This means that at any cut off point in the scales there would be some degree of misclassification. A detailed consideration of the misclassification at various cut off points has already been carried out. Though the aim in this inquiry is to predict the students at risk of failing or dropping out, as accurately as possible, a cut off point which gives a 100% correct classification for such students misclassifies more than 90% of the Successful students (Tables 110 and 111). This is uneconomical. A cut off point between Class IV and V seems to be the most economical for the males. This correctly classifies 70% of Drop-outs and 54% of the Failures but at the cost of misclassifying 30% of the Moderately Successful and 18% of the Very Successful students.

For females a cut off between Class III and IV seems to be the most economical. This would correctly classify 59% of Drop-outs and 61% of the Failures but at the cost of 34% of the Moderately Successful and 19% of the Very Successful students.

A perfect prediction scale would give a cut off point above which all students pass and below which all students fail. With that ideal in view the success of the scale developed in this study can be described only as moderate. However, in practice, such an ideal is hardly ever achieved. The misclassification may be due to the following reasons:-

1. Not all the relevant variables were considered in this study, I.Q. for example was not considered. However, there are practical limitations to any such investigation.

2. The instruments with which the predictors were measured were not reliable enough. This is true with respect to at least some of the items in the questionnaire. To take an example, the motivational factors, in the absence of any objective instruments, had to be tested with rather simple and subjective questions for which a high reliability of answers could not be expected.

3. The most important factor, however, seems to be the unreliability of the criterion. It is well known that the lower the intrinsic reliability of the criterion, the lower is its predictability. The criterion in this study was the first degree examination performance and once again, the poor reliability of examination procedures must be mentioned.

## Chapter 13

## CONCLUSIONS

The author set out with the aim of finding the factors related to failure and drop-out during the first year at Edinburgh University and to see if a combined use of the different variables would lead to an efficient prediction.

The following main conclusions may be drawn from the inquiry:

1. School Achievement Score is related to academic performance but is much better at discriminating between an outstanding student and an average student than between an average student and a poor student.

2. Lower Social Class and Lower Educational Achievement of the Parents, are related to poor academic performance for the females but not for males. It is suggested that this may be due to differences in motivation in males and females; a male student, in quest of a degree is able to overcome a cultural heritage in which higher education is not considered very important, while a female student 'gives in' to the values of the culture she comes from.

3. Psychological Disturbance at the time of entry to University has a positive but low level relation with poor academic performance. It is suggested that a measurement at one point in time may not be enough to assess the emotional disturbance in young adolescent students, who because of a rather high emotional lability, typical of this period in life, would show very quick changes in the level of 'disturbance'.

4. 'Reported Emotional Disturbance', six months after entry is related to poor academic performance for males but not for females. It is suggested that the males report emotional disturbance only after experiencing academic or other difficulties, severe enough to interfere with their academic performance; the threshold for females is lower and they report 'disturbance' even after minor difficulties which actually do not interfere with their academic performance.

5. Low school grades are equally related to failure or drop-out but a student who, besides having low grades, shows low religious participation, is a foreign national or is unenthusiastic about coming to the University stands a higher risk of dropping out before appearing for the September examination. Risk of dropping out is even greater for a female whose father was not in favour of her coming to the University.

6. In spite of applying uniform criteria for the categorisation of students, some faculties show a much higher failure and drop-out rate than the other faculties. This difference cannot be explained in terms of the students' characteristics considered in this study. Multiple regression shows that the Law faculty would still have a high failure and drop-out rate even if its students were matched on all these characteristics with those in other faculties. This may either be due to the fact that the Law faculty students carry some special 'risk' factor not considered in this study or that the 'built in' wastage rates in the Law faculty are high.

7. No factor emerges as the single main cause of poor academic performance but when various factors are considered in combination an instrument can be prepared which predicts the future academic performance of the students in a satisfactory fashion. Both the Multiple regression scale and the Simple prediction scale predict equally well. The validity of the former is fully confirmed but since the latter predicts as well as the former, it is suggested that purely on common sense grounds, the validity of the Simple Prediction Scale may also be accepted.

The Simple Prediction Scale is recommended for use in practice because it needs much less information and is much simpler to analyse.

The findings raise the following questions:

(1) How is the Simple Prediction Scale to be used in practice?

(2) What future lines of research are indicated by this inquiry?

Practical application of the Simple Prediction Scale

The scale can be used in practice in spite of the fact that some students are certain to be misclassified. The academic performance of the males may be taken as an example. Table 110 shows that if all male students below a score of 9 were considered to be at risk, 70% of the Voluntary drop-outs and 54% of the Failures would be correctly classified but at the cost of misclassifying 30% of the Moderately Succe ssful and 18% of the Very Successful students. In absolute terms it would mean that 129 out of 229 students at risk are correctly classified but 220 out of 826 students not at risk are wrongly assigned to the 'risk' category.

This misclassification is less worrying, however, if the aim of the exercise is kept in mind, which is to help the students at risk and not to improve the selection procedures.

The author is convinced that the benefits of identifying at the time of entry, 129 students who are at risk of failing or dropping out are much greater than: (a) the cost of identifying students at risk and (b) the cost of 'helping' these students.

The following simple scheme may be offered to support the author's conviction:

1. Cost of identifying the students at risk: A part of the information required for the Scale is already available on the matriculation form. The rest of the information, obtainable in less than five minutes (Appendix F), can be collected by the Directors of Study to whom all students report at the beginning of the year. The analysis of the data is simple and can be carried out with the computer programme already written for this study. The cost of gathering the information is, therefore, negligible.

2. Cost of the 'help' provided to the students: .The author suggests nothing more than that the Directors of Study meet these students, i.e.(those 129 assigned correctly and those 220 assigned incorrectly to this group), at regular intervals. It is hoped that during these meetings the students would bring forward their academic and other difficulties. The Directors would handle the simpler difficulties

themselves and refer the students with more difficult problems to the tutors, Student Welfare department, chaplains and the Student Health Service, depending upon the nature of the problem. The cost of this extra time and energy spent by the Directors can be calculated but it is not likely to be very large.

3. 'Benefits' of the scheme: Society spends about £700 per student per year (Malleson 1963a). Even if half of the 129 students could be saved in this fashion it would mean a saving of £45,000. This is only a part of the saving; more important perhaps is the saving of the dignity of a student, a failure having a damaging influence on the student's self concept (Malleson 1968)

This simple outline of a 'scheme' is presented only to support the author's conviction about the practical advantages of using the Simple Prediction Scale. It is fully realised that much more thought will have to be spent before this bare framework can become a practical reality.

Lines for further research:

1. The prediction scale can be improved by a second order analysis of the middle categories, either by using new variables or by carrying out an intensive inquiry into some of the variables already considered in this study.

2. After choosing an appropriate 'scheme' of helping the students an experiment can be designed to test its utility. For this operation, the 'high risk' students could be identified with the scale, this cohort could be divided into two equal groups and the services of the scheme provided for one group, the other acting as a control. If the scheme is effective one would expect a lower failure and drop-out rate in the experimental group. A costing of the scheme could also be carried out simultaneously.

3. One of the main problems, mentioned again and again in this thesis is the poor reliability of examination procedures. It is suggested that an intensive effort be made to define the objectives of examination procedures and to develop reliable methods of evaluating students' academic performance. To take up the analogy given in the introductory chapter once again, an essential rule of the 'game' of discovering the nature of the 'elephant' is that the latter does not keep on changing its form.

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# APPENDICES

## APPENDIX A

## A NOTE ON THE NON RESPONDERS

To remove any suspicion of bias in sampling, an analysis was carried out to see if the students who did not respond to the two questionnaires were in any way different from those who did.

### 1st Questionnaire

The problem was not very acute with respect to the 1st questionnaire as only 19 students (1%) did not respond to it. Three of these had actually refused to answer the questionnaire and the others just failed to return the schedule.

The academic performance of these 19 students was no worse than the performance of the rest of the cohort. There were 12 males and 7 females, a ratio similar to that found in the rest of the cohort.

### 2nd Questionnaire

There were 155 students who did not fill up the 2nd questionnaire. As it was intended to find relationships between the items on the 2nd questionnaire and the future academic performance, it was necessary to establish that those who did not respond were not different from the total population in any radical fashion. One way of establishing this was to compare the non-responders and the total population on some of the characteristics about which information was available from the 1st questionnaire.

Given below are some comparisons made between the total cohort and the non-responders.

1. Sex

| | Total Cohort | Non-Responders |
|---|---|---|
| Males | 57% | 63% |
| Females | 43% | 37% |

2. Social Class

| | Total Cohort | Non-Responders |
|---|---|---|
| High social classes | 67% | 60% |
| Lower social classes | 33% | 40% |

3. Nationality

| | Total Cohort | Non-Responders |
|---|---|---|
| Scottish | 71% | 75% |
| Other British | 25% | 22% |
| Foreign | 4% | 3% |

4. P.D. Score

| | Total Cohort | Non-Responders |
|---|---|---|
| Not Disturbed | 70% | 70% |
| Moderately Disturbed | 24% | 25% |
| Disturbed | 6% | 5% |

5. Non-Response by Faculty

| | Non-Responders |
|---|---|
| Arts | 8% |
| Science | 8% |
| Social Science | 10% |
| Law | 15% |
| Medicine | 5% |

The proportion of males in the non-responders is slightly higher than that in the total population. The proportion of lower social classes in the non-responders is slightly higher than that in the total population. There are hardly any differences in the nationality or the P.D. score.

From the very slight differences observed and the fact that the non-response rate was in any case very low, it may safely be concluded that the responders were representative of the total population.

Considerable inter-faculty differences were observed in the response rate from different faculties. Fifteen per cent of the Law students did not answer the 2nd questionnaire while only 5% of the Medical students failed to respond. This could be due partly to the fact that there were inter-faculty differences in the proportion of those who had left the University before the 2nd questionnaire was sent. To see if this is true, the percentages are computed once again after excluding those who had already left (and hence could not be expected to reply). The non-response rate by faculty is then as follows:-

| | |
|---|---|
| Arts | 6% |
| Science | 7% |
| Social Science | 7% |
| Law | 11% |
| Medicine | 4% |

The Law faculty still shows the highest non-response rate though the percentage of non-responders comes down from 15% to 11%.

## APPENDIX B

## STATISTICAL TECHNIQUES

The following statistical tests and techniques were used in this study:-

1. Chi square test.
2. Student's 't' test.
3. One way analysis of variance.
4. Partitioned chi square.
5. Scheffe's test for multiple comparisons following one way analysis of variance.
6. Multiple regression.

The chi square test, student's 't' test and the one way analysis of variance are too popular and well known to need any comment in this section. The principle behind the partitioning of chi square has already been described (page 73 ). A very brief account of principles involved in the other techniques follows. No attempt is made, however, to go into the formulas and mathematrical description as the techniques are well documented in the appropriate text books.

Scheffe's test for multiple comparisons: This test is useful when, after finding a significant 'F' ratio, one wants to find out where exactly the difference lies. One can compare two groups at a time and examine if the means are significantly different. Normally the student's 't' test is used to compare two means. However, if a large number of comparisons are to be made following an overall significant 'F' ratio, some of the decisions

which reject the null hypothesis may be due to type 1 error. For example, if 5 independent tests are each made at .05 level, the probability of a type 1 error in one or more of the decisions is $1 - (.95)^5 = .23$. The larger the number of comparisons the larger the number of decisions which might be wrong because of type 1 error. Scheffe has developed a method for constructing simultaneous confidence intervals which avoids the pitfall of permitting type 1 error to become excessively large (Winer 1967).

Multiple regression: This is a technique by which we calculate the 'regression' of a criterion or predicted variable upon a weighted combination of predictor variables.

The meaning of the word 'regression' in this context can be explained by giving a simple example. Let us suppose that one is interested in knowing how the changes in height (X) can affect weight (Y). For any given value of height (X) there will be a range of observed weights and no unique relationship will be found. However, it is possible that as the height increases the mean observed weight also increases. This locus of mean observed weight for a given observed height is called the regression curve of weight (Y) upon height (X). In its crudest form the formula can be written as $Y = f(X)$ where 'f' is the regression coefficient.* The regression coefficient must be distinguished from the correlation coefficient 'r'. 'r' measures the association between X and Y while the regression coefficient measures the change in Y which can be predicted when a unit change is made in X.

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* Actual formula is $Y = B_o + B_1 X$. $B_o$ and $B_1$ are parameters which can never be measured but which can only be estimated by the formula $Y = b_o + b_1 X$. Here $b_o$ is a dummy variable and $b_1$ is the regression coefficient.

It is possible that many such independent variables $X_1$, $X_2$.....$X_n$ are related in this fashion to dependent variable Y. For example, in the present study, School Achievement Score ($X_1$) may predict Success in the first year examination (Y) and Emotional Disturbance ($X_2$) may have a similar relation with success. Clearly if the two variables, i.e. School achievement Score ($X_1$) and Emotional Disturbance ($X_2$) were to be used together, the total predictive power might be increased. Multiple Regression makes a joint use of a number of independent variables, $X_1$, $X_2$ .... $X_n$, each having some power to predict Y with a view to increasing the total predictive power.

For the best results with Multiple Regression (a) the relationships of Y and X's should be linear and (b) the regression coefficients should be additive, i.e. the amount of increase in Y per unit $X_1$ should be independent of the amount of $X_2$ ..... $X_n$.

Occasionally one faces the problem of variables which do not take values on a continuous range, but have two or more distinct levels, (e.g. Nationality in the present study). This problem is dealt with by the use of dummy variables, (Draper and Smith 1967)

# APPENDIX C

## QUESTIONNAIRE I

## EDINBURGH UNIVERSITY STUDENTS INQUIRY

STRICTLY CONFIDENTIAL

We are carrying out an investigation to find out the effect of social and personal factors on the general well-being of students, their progress while at the University and the choice of career on leaving it. All the students entering the University in the year 1967-68 are being contacted and your cooperation is requested in completing this questionnaire, which although divided into six sections, takes on the whole, only about fifteen minutes to complete. The information you give will of course be treated in STRICTEST CONFIDENCE. We are asking your name this time. This will enable us to contact you later. However the information will be kept in our records under a reference number only and not under your name. When the results have been analysed there will be no reference to any individual or to any identifiable case.

You will see that various numbers or letters have been used in most of the questions. These are for coding purposes only. All that you are requested to do is to place a ring around the number or letter opposite the correct answer.

For example, in Question No. 4, if you are single, put a ring around (0) as shown below:-

Civil Status

| | |
|---|---|
| Single ..... | (0) |
| Married ..... | 1 |
| Divorced ..... | 2 |
| Separated ..... | 3 |
| Widowed ..... | 4 |

SECTION 1

1. FULL NAME IN BLOCK LETTERS:
(Underline Surname) .....

2. AGE AT LAST BIRTHDAY: .....

3. SEX: Male ..... 0

Female ..... 1

4. CIVIL STATUS:

Single ..... 0

Married ..... 1

Divorced ..... 2

Separated ..... 3

Widowed ..... 4

5. NATIONALITY:

Scottish ..... 0

English ..... 1

Irish ..... 2

Welsh ..... 3

Other ..... 4

If other, please specify .....

6. FIRST LANGUAGE (MOTHER TONGUE): .....

7. NOMINAL RELIGION:

Protestant ..... 0

Roman Catholic ..... 1

Other ..... 2

None ..... 3

If other, please specify .....

8. DO YOU PARTICIPATE IN RELIGIOUS ACTIVITIES:

Very regularly (At least twice a month) ..... 0

Occasionally (At least four times a year) ..... 1

Rarely (Less than four times a year) ..... 2

Never ..... 3

9. ADDRESS IN EDINBURGH: .....

(If known) .....

.....

PERMANENT ADDRESS: .....

.....

.....

SECTION II

10. ARE YOUR PARENTS:

Living together ..... 0

Separated ..... 1

Divorced ..... 2

Father deceased ..... 3

Mother deceased ..... 4

Both deceased ..... 5

If you ring 1, 2, 3 or 4, how old were you when this happened?

1 ..... 2 ..... 3 ..... 4 .....

11. HAVE YOU ANY STEP BROTHER/SISTER OR HALF BROTHER/SISTER:

Yes ..... 0

No ..... 1

If Yes, pass on to Question 13.

12. WHAT IS YOUR BIRTH POSITION:

..... of ..... children

(For example ....2nd..... of .....five..... children)

13. ARE YOUR PARENTS UNIVERSITY GRADUATES:

Neither ..... 0

Father ..... 1

Mother ..... 2

14. FATHER'S OCCUPATION: (If retired or deceased please give the last occupation). Please be as precise as possible, stating the nature of employment (e.g. self employed, manager, foreman, shop assistant, junior clerk, etc.) and the trade or profession (e.g. Civil servant, retail business, engineer, farmer, miner, etc.)

Nature of employment .....

Trade, industry or profession .....

15. COMPARED WITH OTHER FAMILIES, IS THE DISCUSSION OF PERSONAL PROBLEMS IN YOUR HOME:

Much more free ..... 0

More free ..... 1

About the same ..... 2

More difficult ..... 3

Much more difficult ..... 4

16. COMPARED WITH OTHER FAMILIES, WOULD YOU DESCRIBE YOUR HOME AS:

Happier than most ..... 0

About the same ..... 1

Less happy than most ..... 2

17. WHAT WAS YOUR ATTITUDE TOWARDS COMING TO THE UNIVERSITY:

Much in favour ..... 0

In favour ..... 1

Neutral ..... 2

Opposed ..... 3

Much opposed ..... 4

18. WHAT WAS YOUR FATHER'S ATTITUDE TOWARDS YOUR COMING TO THE UNIVERSITY:

Much in favour ..... 0

In favour ..... 1

Neutral ..... 2

Opposed ..... 3

Much opposed ..... 4

Father deceased or not at home, hence not applicable .. 5

19. WHAT WAS YOUR MOTHER'S ATTITUDE TOWARDS YOUR COMING TO THE UNIVERSITY:

Much in favour ..... 0

In favour ..... 1

Neutral ..... 2

Opposed ..... 3

Much opposed ..... 4

Mother deceased or not at home, hence not applicable .. 5

SECTION III

HERE ARE SOME QUESTIONS ABOUT YOUR SCHOOL BACKGROUND:

20. INDICATE WHICH OF THE FOLLOWING TYPES OF SCHOOLS YOU LAST ATTENDED:

| | | |
|---|---|---|
| If in Scotland: | Junior Secondary ..... | 0 |
| | Senior Secondary ..... | 1 |
| | Comprehensive ..... | 2 |
| | Private or Independent ..... | 3 |
| | Other ..... | 4 |
| If in England and Wales: | Secondary Modern ..... | 5 |
| | Grammar ..... | 6 |
| | Comprehensive ..... | 7 |
| | Private or Independent ..... | 8 |
| | Other ..... | 9 |
| Elsewhere: | State administered ..... | X |
| | Private or Independent ..... | Y |

21. DID YOUR PARENTS PAY FOR YOUR EDUCATION:

| | |
|---|---|
| Wholly ..... | 0 |
| Partially ..... | 1 |
| Not at all ..... | 2 |

22. WERE YOU A:

| | |
|---|---|
| Day Pupil ..... | 1 |
| Boarder ..... | 2 |

23. DO YOU HOLD:

S.C.E. ..... 0

G.C.E. ..... 1

Other Certificate ..... 2

(If other certificate, please specify) .....

.....

24. NAME THE 'HIGHERS' OR 'A' LEVELS YOU HAVE. ALSO MENTION THE PERCENTAGE OF MARKS OBTAINED IN EACH SUBJECT. (Not applicable to those who do not hold a G.C.E. or S.C.E.)

| | 'HIGHERS' or 'A' LEVELS | GRADE (IF KNOWN) |
|---|---|---|
| 1 | ..... | ..... |
| 2 | ..... | ..... |
| 3 | ..... | ..... |
| 4 | ..... | ..... |
| 5 | ..... | ..... |
| 6 | ..... | ..... |
| 7 | ..... | ..... |
| 8 | ..... | ..... |
| 9 | ..... | ..... |

25. HOW BIG WAS THE SCHOOL YOU LAST ATTENDED:

Less than 200 pupils ..... 0

200-500 pupils ..... 1

500-1000 pupils ..... 2

More than 1000 pupils ..... 3

26. HOW SATISFIED WERE YOU WITH YOUR ACADEMIC PERFORMANCE AT SCHOOL:

Perfectly satisfied ..... 0

Quite satisfied ..... 1

Less than satisfied ..... 2

27. AT SCHOOL, HOW ACTIVE A PART DID YOU TAKE IN CLUBS AND SOCIETIES:

Less than average ..... 0

Average ..... 1

More than average ..... 2

28. AT SCHOOL, HOW ACTIVE A PART DID YOU TAKE IN SPORTS:

Less than average ..... 0

Average ..... 1

More than average ..... 2

SECTION IV

29. NAME THE FACULTY IN WHICH YOU HAVE ENROLLED:

Arts ..... 0

Divinity ..... 1

Law ..... 2

Medicine ..... 3

Music ..... 4

Science ..... 5

Social Science ..... 6

Veterinary ..... 7

30. DO YOU INTEND TO WORK FOR AN

Ordinary Degree ..... 1

Honours Degree ..... 2

Diploma ..... 3

Non-Graduating course ..... 4

If you answer 1, 2, 3 or 4, please specify the subject:-

.....

31. IS THE COURSE YOU ARE ATTENDING YOUR FIRST CHOICE:

Yes ..... 0

No ..... 1

If NO, what was your first choice?

.....

32. HAVE YOU DECIDED UPON THE OCCUPATION OR PROFESSION YOU ARE GOING TO ENTER AFTER COMPLETING YOUR STUDIES:

Yes ..... 0

No ..... 1

If YES, please state your first preference.

.....

SECTION V

HERE ARE SOME QUESTIONS ABOUT A FEW CONDITIONS WHICH MAY CAUSE DISTRESS TO SOME PEOPLE. PLEASE PUT A RING AROUND THE NUMBER AGAINST THE QUESTION IF THE CONDITION IS PRESENT IN YOUR CASE. NOTE THAT THE CONDITION HAS TO BE DISTRESSFUL BEFORE YOU PUT THE RING. ALL THE ITEMS SHOULD BE TAKEN LITERALLY. ANSWER THEM AS THEY STAND, RATHER THAN REWORD THEM TO FIT YOUR CASE.

Are you afraid of going out alone? ..... 1

Have you lost interest in almost everything? ..... 2

SECTION V (contd.)

Is the simplest task too much of an effort? ..... 3

Have you found it difficult to concentrate recently? ..... 4

Does the future seem pointless? ..... 5

Are you slower recently in everything you do? ..... 6

Are people talking about you and criticising you through no fault of your own? ..... 7

Are you distressed by silly, pointless thoughts that keep coming into your mind against your will? ..... 8

Are you unnecessarily careful in carrying out even simple everyday tasks like folding up clothes, reading notices, etc.? ..... 9

Do distressing thoughts about sex or religion come into your mind against your will? ..... 10

Do you feel you just have to check things again and again - like turning off taps or lights, shutting windows at night, etc. - although you know there is really no need to? ..... 11

Have you an unreasonable fear that some careless act of yours might have very serious consequences? ..... 12

Do you have an uneasy feeling if you don't do something in a certain order, or a certain number of times? ..... 13

Do you feel that there is some sort of barrier between you and other people so that you can't really understand them? ..... 14

Do you think other people regard you as very odd? ..... 15

Do you often feel puzzled, as if something has gone wrong either with you or with the world, without knowing just what it is? ..... 16

Do you feel you cannot communicate with other people because you don't seem to be on the same "wave length"? ..... 17

Do you have very strange and peculiar thoughts at times? ..... 18

Do you ever lose all feeling in any part of your skin, so that you wouldn't be able to feel a pin prick, or do you ever have burning or tingling sensations? ..... 19

Are you ever so low in spirits that you just sit for hours on end? 20

SECTION VI

HERE ARE A FEW STATEMENTS. PLEASE PUT A CIRCLE ROUND 'TRUE' IF YOU AGREE AND 'FALSE' IF YOU DISAGREE. IF YOU FIND IT DIFFICULT TO DECIDE, PLEASE ASK YOURSELF WHETHER THIS STATEMENT IS ON THE WHOLE TRUE OR FALSE, AND PUT A CIRCLE ROUND THE APPROPRIATE WORD. SOME OF THE STATEMENTS MAY APPEAR NOT TO BE HAVING ANY DIRECT RELATION TO YOU, BUT PLEASE ANSWER ALL THE ITEMS.

Remember to answer each statement.

| | | |
|---|---|---|
| Most people make friends because friends are likely to be useful to them. | True | False |
| I do not blame a person for taking advantage of someone who lays himself open to it. | True | False |
| I usually expect to succeed in things I do. | True | False |
| I have no enemies who really wish to harm me. | True | False |
| I wish I could get over worrying about things I have said that may have injured other people's feelings. | True | False |
| I think nearly anyone would tell a lie to keep out of trouble. | True | False |
| I don't blame anyone for trying to grab everything he can get in this world. | True | False |
| My hardest battles are with myself. | True | False |
| I know who is responsible for most of my troubles. | True | False |
| Some people are so bossy that I feel like doing the opposite of what they request, even though I know they are right. | True | False |
| Some of my family have habits that bother and annoy me very much. | True | False |
| I believe my sins are unpardonable. | True | False |
| I have very few quarrels with members of my family. | True | False |
| I have often lost out on things because I couldn't make up my mind soon enough. | True | False |
| I can easily make other people afraid of me, and sometimes do for the fun of it. | True | False |

| | | |
|---|---|---|
| I believe I am a condemned person. | True | False |
| In school I was sometimes sent to the headmaster for misbehaviour. | True | False |
| I have at times stood in the way of people who were trying to do something, not because it amounted to much but because of the principle of the thing. | True | False |
| Most people are honest chiefly through fear of being caught. | True | False |
| Sometimes I enjoy hurting persons I love. | True | False |
| I have not lived the right kind of life. | True | False |
| Sometimes I feel as if I must injure either myself or someone else. | True | False |
| I seem to be about as capable and smart as most others around me. | True | False |
| I sometimes tease animals. | True | False |
| I get angry sometimes. | True | False |
| I am entirely self-confident. | True | False |
| Often I can't understand why I have been so cross and grouchy. | True | False |
| I shrink from facing a crisis or difficulty. | True | False |
| I think most people would lie to get ahead. | True | False |
| I have sometimes felt that difficulties were piling up so high that I could not overcome them. | True | False |
| If people had not had it in for me I would have been much more successful. | True | False |
| I have often found people jealous of my good ideas, just because they had not thought of them first. | True | False |
| Much of the time I feel as if I have done something wrong or evil. | True | False |
| I have several times given up doing a thing because I thought too little of my ability. | True | False |
| Someone has it in for me. | True | False |

| | | |
|---|---|---|
| When someone does me wrong I feel I should pay him back if I can, just for the principle of the thing. | True | False |
| I am sure I get a raw deal from life. | True | False |
| I believe I am being followed. | True | False |
| At times I have a strong urge to do something harmful or shocking. | True | False |
| I am easily downed in an argument. | True | False |
| It is safer to trust nobody. | True | False |
| I easily become impatient with people. | True | False |
| I deserve severe punishment for my sins. | True | False |
| At times I think I am no good at all. | True | False |
| I commonly wonder what hidden reason another person may have for doing something nice for me. | True | False |
| I get mad easily and then get over it soon. | True | False |
| At times I feel like smashing things. | True | False |
| I believe I am being plotted against. | True | False |
| I certainly feel useless at times. | True | False |
| At times I feel like picking a fist fight with someone. | True | False |
| Someone has been trying to rob me. | True | False |
| I am certainly lacking in self-confidence. | True | False |

APPENDIX D

QUESTIONNAIRE II

EDINBURGH UNIVERSITY STUDENTS INQUIRY

STRICTLY CONFIDENTIAL

Dear Sir/Madam,

At the beginning of the Autumn term last year you were kind enough to complete a questionnaire in connection with our investigation on the general well-being of the students and their progress while at the University.

Now that you have been at the University for a few months perhaps you would help us by giving some more information. The information you give will of course be held in the strictest confidence and under a reference number only.

The present questionnaire will take no more than five minutes to complete. It is mostly precoded and all you are requested to do is to place a ring round the number opposite the answer which is correct for you. (Any special directions are given along with the particular question).

After completing the questionnaire please send it back to us in the enclosed stamped addressed envelope.

Thank you,

Yours sincerely,

(Dr. R.L. Kapur),
Faculty of Medicine,
Teviot Place,
Edinburgh, 8.

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Question 1

Where are you currently staying:

In a Hall of Residence ..... 0

In a Student House ..... 1

In a flat - alone ..... 2

In a flat - shared ..... 3

Question 1 (contd.)

In digs (with some or all food provided) ..... 4

In digs (with no food provided) ..... 5

With parents ..... 6

With relatives ..... 7

Some other type of accommodation ..... 8

If other, please specify .....

Question 2

Have you changed your accommodation since coming to University?

Yes ..... 0

No ..... 1

If YES, where were you living before you moved into your present accommodation?

.....

.....

Question 3

How satisfied are you with your current living arrangements:

Quite satisfied ..... 0

Not satisfied, but shall continue ..... 1

Not satisfied, but intend to change ..... 2

Question 4

What kind of financial assistance are you getting while at the University:

1. Grant only ..... 0
2. Competitive Bursary, or scholarship only ..... 1
3. Grant, Bursary or scholarship plus financial help from parents ..... 2
4. Financial help from parents only ..... 3
5. Some other kind of financial assistance ..... 4

Question 5

Are the present financial arrangements:

Quite satisfactory ..... 0

Source of stress to you ..... 1

Source of stress to your parents ..... 2

Source of stress to you and your parents ..... 3

Question 6

Please name the Society or societies you have joined since coming to the University (whether inside or outside the University)

Give yourself a score of 3, if you hold an official position.

score of 2, if you have attended more than 50% of meetings.

score of 1, if you have attended less than 50% of meetings.

| | Name of Society | Score |
|---|---|---|
| 1. | ..... | ..... |
| 2. | ..... | ..... |
| 3. | ..... | ..... |
| 4. | ..... | ..... |
| 5. | ..... | ..... |
| 6. | ..... | ..... |
| 7. | ..... | ..... |
| 8. | ..... | ..... |
| 9. | ..... | ..... |

Question 7

Name the competitive sport and or games you have taken part in after coming to the University.

Give yourself a score of 3, if you represent the University team
score of 2, if you play regularly
score of 1, if you play very occasionally

| | Name of Games or Sports | Score |
|---|---|---|
| 1. | ..... | ..... |
| 2. | ..... | ..... |
| 3. | ..... | ..... |
| 4. | ..... | ..... |
| 5. | ..... | ..... |
| 6. | ..... | ..... |
| 7. | ..... | ..... |
| 8. | ..... | ..... |
| 9. | ..... | ..... |

Question 8

Please give the number of close friends you have had since coming to the University, that is men and women you meet regularly outside class hours (at least once a week).

Same sex (number) .....

Opposite sex (number) .....

Question 9

Have you got a special friend of the opposite sex.

Yes ..... 0

No ..... 1

If you are already married please overlook the question and put a cross here .....

Question 10

Do you feel you have sufficient contact with the teaching staff.

Very poor contact ..... 0

Some contact but not enough ..... 1

Sufficient contact ..... 2

Question 11

Do you have sufficient contact with your director of studies.

Very poor contact ..... 0

Some contact but not enough ..... 1

Sufficient contact ..... 2

Question 12

Do you feel you have made the right decision in coming to the University.

Yes ..... 0

Yes, but should have gone to some other University ... 1

No, should not have come to the University at all .... 2

Question 13

Do you feel you are happy with your choice of course.

Yes, quite happy ..... 0

Not happy, but shall continue ..... 1

Not happy, but intend to change ..... 2

Not happy, have changed already ..... 3

If you have changed your course, please specify the subjects

1 ..... 2 ..... 3 .....

4 ..... 5 ..... 6 .....

Question 14

Between the beginning of the Autumn term, 1967 and today:

a. Have you been physically unwell.

No ..... 0

Yes ..... 1

If YES, did you consult a doctor.

Yes ..... 0

No ..... 1

Question 14 (contd.)

b. Have you been emotionally or nervously unwell.

No ..... 0

Yes ..... 1

If YES, did you consult a doctor.

Yes ..... 0

No ..... 1

# APPENDIX E

## Multiple Regression Scale

| Variable | Regression Coefficient | |
|---|---|---|
| | Males | Females |
| Civil state : Married | 0.1449 | -0.1745 |
| Language : English | 0.0670 | -0.0199 |
| Religion : Protestant | 0.0549 | -0.1249 |
| Religion : Catholic | -0.0424 | -0.1907 |
| Religion : None | 0.0139 | -0.0415 |
| Religious participation : Low | -0.0002 | -0.0405 |
| Birth position : Only | 0.0406 | 0.0648 |
| Birth position : 1st | 0.0312 | -0.0214 |
| Birth position : Last | 0.0206 | -0.0197 |
| Education of parents : Graduates | 0.0315 | 0.0474 |
| Father's occupation : Upper class | 0.0392 | -0.0361 |
| Attitude to University : Unfavourable | -0.0342 | -0.0498 |
| Type of School : Private | 0.0410 | 0.0274 |
| Type of School : Grammar | 0.0076 | 0.0552 |
| Type of Certificate : S.C.E. | -0.1404 | -0.0304 |
| S.A.S. | 0.0128 | 0.0131 |
| Size of School : Small | -0.0005 | -0.0051 |
| Satisfaction with performance at school : Unsatisfied | -0.0489 | -0.0688 |
| Clubs and Societies : Poor interest | -0.0341 | 0.0008 |
| Sports : Poor interest | -0.0160 | 0.0179 |
| Choice of course : First choice | -0.0164 | -0.1836 |
| Commitment to occupation : Committed | 0.0452 | 0.0308 |
| P.D. Score : High | -0.0078 | -0.0058 |
| Total Hostility : High | -0.0006 | 0.0029 |
| Direction of Hostility : Intropunitive | 0.0002 | -0.0028 |
| Age : Older | -0.0146 | 0.0156 |

## Additional contributions to the regression equation from the Faculties

| Faculty | Regression Coefficient | |
|---|---|---|
| | Males | Females |
| Arts | -0.0850 | -0.3546 |
| Law | -0.2904 | -0.6040 |
| Medicine | 0.0335 | 0.1563 |
| Science | -0.1659 | -0.3606 |
| Social Science | 0.0500 | - 0.2882 |
| Veterinary | 0.0809 | -0.1749 |
| Dentistry | 0 | 0 |

## SIMPLE PREDICTION SCALE (FEMALES)

| VARIABLE | CATEGORY | SCORE |
|---|---|---|
| 1. School Achievement Score | (a) more than 9 | 2 |
| | (b) less than 9 | 0 |
| 2. Type of certificate | (a) G.C.E. with or without S.C.E. | 2 |
| | (b) S.C.E. alone | 0 |
| 3. Satisfaction with school performance | (a) very satisfied | 2 |
| | (b) average | 1 |
| | (c) less than satisfied | 0 |
| 4. Age | (a) below 20 | 2 |
| | (b) above 20 | 0 |
| 5. Nationality | (a) Foreign or other British | 2 |
| | (b) Scottish | 0 |
| 6. Attitude towards coming to University | (a) favourable | 2 |
| | (b) not in favour | 0 |
| 7. Religious participation | (a) high | 2 |
| | (b) low | 0 |
| 8. P.D. Score | (a) 0-1 | 2 |
| | (b) 2 or more | 0 |
| 9. Father's attitude | (a) favourable | 2 |
| | (b) not in favour | 0 |

SIMPLE PREDICTION SCALE (FEMALES) contd.

| VARIABLE | CATEGORY | SCORE |
|---|---|---|
| 10. Social class | (a) I and II | 2 |
| | (b) III, IV and V | 0 |
| 11. Educational achievment of the parents | (a) both or one parent graduates | 2 |
| | (b) neither parent graduate | 0 |
| 12. Admission to the choice of Course | (a) first choice | 2 |
| | (b) not first choice | 0 |
| 13. Faculty | (a) Medicine and Veterinary | 2 |
| | (b) Arts, Science, Music and Social Science | 1 |
| | (c) Law | 0 |

## APPENDIX F

### SIMPLE PREDICTION SCALE (MALES)

| VARIABLE | CATEGORY | SCORE |
|---|---|---|
| 1. School Achievement Score | (a) more than 9 | 2 |
| | (b) less than 9 | 0 |
| 2. Type of certificate | (a) G.C.E. with or without S.C.E. | 2 |
| | (b) S.C.E. alone | 0 |
| 3. Satisfaction with school performance | (a) very satisfied | 2 |
| | (b) average | 1 |
| | (c) less than satisfied | 0 |
| 4. Age | (a) below 20 | 2 |
| | (b) above 20 | 0 |
| 5. Nationality | (a) other British | 2 |
| | (b) Scottish | 1 |
| | (c) Foreign | 0 |
| 6. Attitude towards coming to University | (a) favourable | 2 |
| | (b) not in favour | 0 |
| 7. Religious participation | (a) high | 2 |
| | (b) low | 0 |

SIMPLE PREDICTION SCALE (MALES) contd.

| VARIABLE | CATEGORY | SCORE |
|---|---|---|
| 8. P.D. Score | (a) 4 or less | 2 |
| | (b) 5 or more | 0 |
| 9. Self Criticism Score | (a) 4.5 or less | 2 |
| | (b) 4.6 or more | 0 |
| 10. Delusional Hostility Score | (a) .99 or less | 2 |
| | (b) 1 or more | 0 |
| 11. Discussion of Personal Problems at Home. | (a) difficult | 2 |
| | (b) free | 0 |
| 12. Fa culty | (a) Medicine, Veterinary, Social Science | 2 |
| | (b) Arts and Science and Music | 1 |
| | (c) Law | 0 |